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LEXICAL PATTERNS IN THE READING COMPREHENSION SECTION OF THE TOEFL® TEST:

AN INVESTIGATION OF THE ROLE OF LEXICAL COHESION IN FIXED-RESPONSE EFL READING COMPREHENSION QUESTIONS

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Tese apresentada à Universidade Federal Fluminense para a obtenção do grau de Doutor em Filosofia

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Abstract

This thesis argues that lexical patterns may be observed connecting question stems and/or correct options to relevant portions of the related passages in fixed-response reading comprehension test items on the TOEFL® test. Results stemming from the lexical cohesive analysis of a corpus of 608 TOEFL® practice reading comprehension test items suggest that these patterns are, more often than not, realized by specific categories of lexical repetition, or lexical links (Hoey, 1991) according to question type.

Equivalent results found for TOEFL ® PBT, CBT, and iBT items appear to indicate that the patterns are in evidence across different versions of the test, even though these editions may, in certain instances, test the same reading skills by means of different question types.

Finally, based on the results of an additional analysis of the level of difficulty of the same test items, it is claimed that the lexical patterns associated with the different question types in the corpus have a bearing on the general range of difficulty of the latter in terms of the 'type of match variable' (Jamieson, 2000).

Resumo

Este estudo propõe que padrões lexicais podem ser observados ligando perguntas e / ou opções corretas a pontos relevantes do texto em questão em perguntas objetivas de leitura e compreensão no TOEFL®. Resultados da análise coesivo-lexical de um corpus de 608 perguntas retiradas de testes práticos oficiais, produzidos pelos criadores do TOEFL®, sugerem que estes padrões são freqüentemente realizados por categorias específicas de repetição lexical, ou laços lexicais (Hoey, 1991).

Resultados similares encontrados para questões retirados do TOEFL® PBT, CBT, e iBT parecem indicar que os padrões lexicais são comuns a todas as versões do teste, ainda que, em alguns casos, certas habilidades de leitura sejam avaliadas por meio de tipos diferentes de questão.

Finalmente, com base nos resultados da análise do nível de complexidade das mesmas questões em relação à 'variável tipo de equivalência' (Jamieson et al., 2000), este estudo argumenta que os padrões lexicais associados aos diferentes tipos de questão no corpus exercem influência sobre seu nível geral de dificuldade.

To Kandus,

the better half of our pattern

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On an individual level, I would like to thank Michael Hoey, whose work on lexical cohesion has been the major source of inspiration for this thesis. His invaluable academic input has been of great importance in the lexical cohesive analysis of the corpus in this research. I would also like to thank Kimiko Nakanishi, at the University of Calgary, and Nicholas J. Belkin, at Rutgers University, for their promptness in offering help and advice.

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Chapter 1

Introduction

1.1 The Aims of the Thesis

Some are readily observable through our senses, others have to be inferred or discerned from a set of rules: from our knitted sweaters, to the laws of physics, to our language system, we are surrounded by patterns. These patterns may be a means to make or generate concrete things, or, at more abstract levels, they may be a means of making sense of underlying structures. From their simplest to their most complex forms, patterns are based on repetition. This study is concerned with patterns in written English discourse formed by lexical repetition, or lexical cohesion. More specifically, this thesis aims to investigate the role of lexical cohesion in the assessment of reading in English as a foreign language by reference to a standardized proficiency test.

Established research by Hoey (1991) in the area of written discourse analysis in English has demonstrated that different forms of lexical repetition combine to organize text. His study has provided evidence that instances of lexical repetition mark points of reference between sentences. The same research has also demonstrated that the observation of repetition patterns in text allows for, among other things, the identification of both adjacent and non-adjacent sentences which are significantly connected to one another, as

well as sentences which are central to the development of the general theme of the passage.

Although briefly mentioned in the conclusion of his study, the implications of the phenomenon described by Hoey (1991) for successful reading comprehension have yet to be explored, at the time of writing. In order to address this issue, it would seem logical to initially determine both the nature of reading, and what is meant by effective reading comprehension. Nevertheless, as suggested by decades of research focusing on the product and process of reading, that is not an easy task.

Earlier research into reading used a *product approach*, which focused on *what* understanding was reached, rather than on *how* that understanding was reached (e.g., Bernhardt and Kamil, 1995; Bossers, 1991; Carrell, 1991; Perkins, Brutten and Pohlmannm, 1989). Studies of this nature often involved the use of some measure of text understanding (e.g., test questions, summaries, interviews), and the subsequent drawing of a parallel between the results reached and specific variables of interest.

Alderson (2000: 5) mentions two limitations of product approaches to reading, namely (a) the variation in the product, and, secondly, (b) the method used to measure the product. The former limitation arises from readers' diverse understandings from text. This diversity in comprehension may be due, in part, to the fact that texts do not necessarily 'contain' meaning which needs to be unveiled by capable readers. Rather, it might be argued that "*texts gain their meaning from a reader's interaction with them.*" (Hoey, 2001: 5) Because readers may differ in their background knowledge and experiences, the

product of their interaction with texts, or their comprehension of these texts, may also differ.

The second limitation associated with product approaches to reading is the fact that the methods used to assess comprehension are less than perfect. Thus, Alderson (2000: 7) claims that certain test methods, including cloze techniques and gap-filling, may be said to induce certain readers to read in a particular way (e.g., reading the text preceding the gap, and ignoring other portions of the text), thus affecting the reading product. In addition, certain methods are restricted in terms of the levels of understanding they are capable of assessing. While cloze and gap-filling tasks may be used to assess a reader's ability to read 'the lines', or the literal meaning of text, these methods seem to be of limited use with regards to assessing a reader's ability to read 'between the lines' or 'beyond the lines', i.e., inferred meanings and critical evaluations of text, respectively. (Gray, 1960, cited in Alderson, 2000)

In more recent decades, research on reading in both L1 and L2 have used a *process approach* (e.g., Anderson, 1999; Cohen, 1996; Mills, Magliano, and Todaro, 2006). Attempts have been made to tap into the mental, or cognitive, processes through which readers try to derive meaning from text, mainly by means of introspective methodologies, including think-aloud protocols, also termed *verbal protocols* (Hosenfeld, 1984), or verbal retrospection in interviews. In common with other methods for data collection in reading studies, introspective techniques have their limitations. Rankin (1988: 121) mentions that *"subjects' reports on their mental processes are not complete, and may be influenced by their perception of what the researcher 'wants' them to do."*

In spite of the shortcomings associated with clearly defining the construct of reading ability, including the full range of skills required for successful comprehension, the use of standardized proficiency tests to assess readers' degree of 'mastery' of reading in English remains a relatively common practice. These tests are, more often than not, applied within educational settings with the purpose of identifying prospective undergraduate or graduate students who might be at academic risk if admitted to an institution where the medium of instruction is English because of the limited level of their reading ability in that language. To that effect, Alderson (2000) argues that the plain fact is that, although admittedly imperfect, the assessment of reading is a genuine necessity. Moreover, the same author cites the added benefit that the study of reading comprehension tests and the abilities that appear to be being measured by those tests may lead to a better understanding of what one has assessed. He contends: *"it is only by trying to operationalize our theories and our understandings of the constructs through our assessment instruments that we can explore and develop our understanding*." (op.cit.: 2)

With these insights in mind, it was decided that the analysis of a reading assessment tool might well shed light into the role of the observance of lexical patterns in what is perceived—within the *criterion* and *test method* constraints of that instrument (See Section 1.2, below)—as effective comprehension.

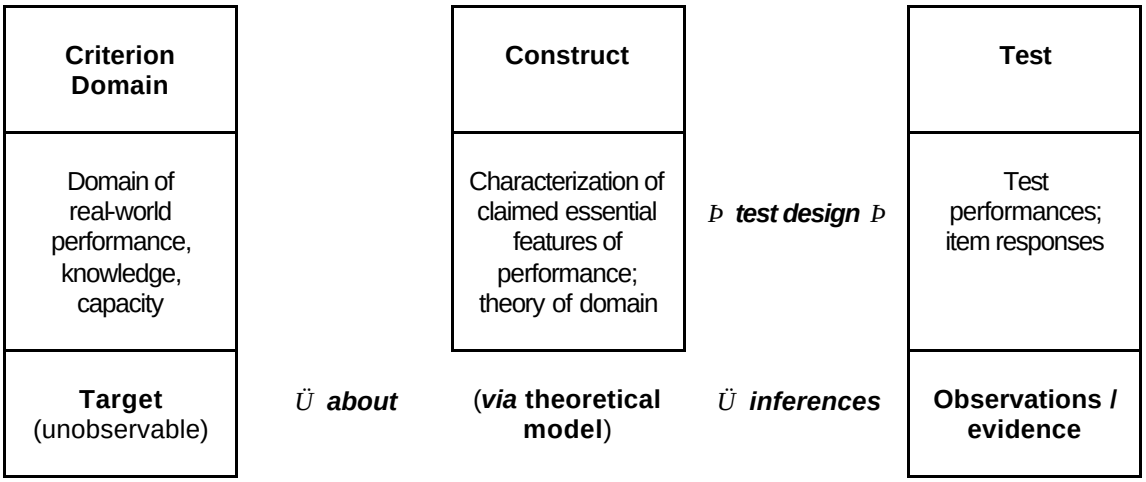
1.2 Data, Hypotheses and Research Questions

It has been stated above that the aim of this study is to explore the implications of the text-forming function of lexical cohesive patterns in English for the assessment of effective EFL reading comprehension. Because of its worldwide reputation as one of the most widely accepted proficiency tests of English, it was felt that the Test of English as a Foreign Language (henceforth, the TOEFL® test) would be a trustworthy source of material representative of standard assessment of effective reading skills in English. A system for the analysis of lexical patterns in the TOEFL® reading comprehension tests selected for this corpus was designed, based largely on Hoey's (1991) lexical repetition model.

Initially, certain basic constraints involved in the test design of the TOEFL® Test had to be considered. The constraints taken into account for the purposes of this study included: *criterion domain*, *assessment construct, test content,* and *test method*. McNamara (2006) highlights that language tests are procedures for drawing generalizable inferences. He mentions that the assessment target, *"the inferences we would like to draw about learners: what they know, what they can do, what performance they are capable of* ***beyond*** *the assessment setting … is known as the* ***criterion domain***." (op.cit.: 28, original emphasis) The same author adds that the inferences drawn from evidence provided by test results are mediated by a theoretical model based on the criterion domain. This model consists of a "*characterization of claimed essential features of performance*" and is termed the *assessment construct*. (op.cit.: 28-9) The assessment construct is, in turn,

reflected in the *test content*—"*what a test contains in terms of texts, tasks, item types, skills tested, etc.*"—, as well as the *test method*—"*the way in which the candidate is asked to engage with the materials and tasks in the test, and how their response will be scored.*" (McNamara, 2000: 137) Figure 1, taken from McNamara (2006: 28), illustrates the process of test conception and design.

Figure 1 Criterion, construct, and test



The criterion involved in the Reading Comprehension Section of the TOEFL® test is the expected reading performance of candidates in academic settings where the language of instruction is English. Three hypotheses regarding the role of lexical cohesion in the construct of reading based on this criterion have been considered by reference to the test content and method employed in that section of the TOEFL® test.

The first hypothesis regards the response format of the reading questions, or *test items*, in the TOEFL® test—the fixed-response, or multiple-choice, format. A pilot study conducted by this researcher involving 300 TOEFL® practice reading comprehension questions (MacMillan, 2006)

investigated whether points of reference marked by lexical cohesion, as described by Hoey (1991), might be observed connecting those test items with specific portions of the passages in question. Results of that study suggested that statements formed by the addition of question stems and correct options almost invariably established a significant connection with specific sentences in the passages in question by means of multiple instances of lexical repetition. It was then hypothesized whether different question types, targeting different reading skills, would involve specific types of lexical repetition, thus creating lexical patterns.

A second hypothesis, dependent on the fulfillment of the first, focuses on the differences in test method relative to three the different versions of the TOEFL® test (Paper-based, Computer-based, and Internet-based) available during the process of data collection for this study[1]. In case lexical patterns may be associated with specific question types, it was hypothesized whether these patterns would hold across different versions of the test, provided the skills tested were the same.

Finally, the third hypothesis, also dependent on the fulfillment of the first hypothesis, concerns the level of difficulty of the test items. In case lexical patterns may be observed in the Reading Comprehension Section of the TOEFL® test, it was further hypothesized whether the specific types of lexical repetition involved in the identification of correct options might be associated with the level of difficulty of each item.

[1] It was announced on the official TOEFL® website (www.toefl.org) that after September 30, 2006, the Computer-based version of the TOEFL® test (TOEFL® CBT) would no longer be offered. At the time of writing, the TOEFL program is phasing in the Internet-based version of the TOEFL® test (TOEFL® iBT). In areas where the TOEFL® iBT is not yet available, the Paper-based version of the TOEFL® test will be offered to continue to provide access for TOEFL test takers in these areas.

The following subsection will provide an overview of the sequence in which this thesis will attempt to check these hypotheses.

1.3 Overview of the Thesis

This introductory chapter has defined the major focus of this thesis and the theoretical background underlying the choices made in terms of the source for data collection, as well as the basis for the analytical system designed to approach the three complementary research questions arising from the hypotheses discussed in Section 1.2, above. These questions are:

a) Is it possible to identify cohesive patterns relative to specific test items connecting questions to relevant sentences in the passage?

If so,

b) Do these cohesive patterns hold across different versions of the test, which might employ different question types to assess given reading skills?

And, finally,

c) Is it possible to observe any correlation between cohesive patterns and item difficulty?

Chapter 2 will provide a review of a selection of the literature highlighting the study of cohesion in the analysis of English written discourse. This review will include a brief introduction of the repetition model (Hoey, 1991), based on lexical cohesion, which laid the foundation for the design of the system used for the analysis of the TOEFL® reading comprehension tests

forming the corpus of this thesis.

Chapter 3 will include a description of the content and method of the tests in this corpus, by reference to frameworks of the TOEFL® test (Enright et al., 2000; Jamieson et al., 2000) produced with the support of the Educational Testing Service (henceforth, the ETS), the institution which designs and distributes the TOEFL® test worldwide.

Chapter 4 will outline the methodology employed to attempt to answer the research questions motivating this thesis, and Chapter 5 will, in turn, report on the results found.

Finally, in Chapter 6, the conclusions reached by this thesis will be presented, including the pedagogical implications involved. This will be followed by a discussion of the limitations of this study and possible avenues for future research.

Chapter 2

The Study of Cohesion in Written English Discourse

2.1 Overview

In the introductory chapter, three complementary questions regarding the role of lexical cohesion in the Reading Comprehension Section of the TOEFL® test were raised (Section 1.3, above). In this chapter, a review of a selection of the literature focusing on the study of cohesion in the analysis of English written discourse is felt to be appropriate. This review will be followed, in Chapter 3, by a description of the TOEFL® Reading Comprehension Section, and subsequently, in Chapter 4, by an outline of the methodology employed in an attempt to answer the research questions motivating this study.

The studies reported on in this chapter may be categorized in two major groups in terms of their focus, namely, first, the nature of cohesion, and, secondly, the text-organizing function of cohesion. The chapter will begin with a discussion of two of the most influential studies which focused on the description of cohesion in its various instances, with insights drawn from Halliday and Hasan (1976), and Hasan (1984). The latter part of this same chapter will, in turn, focus on studies which developed analyses of the role of cohesion in textual organization, including Winter (1977, 1979, 1982, 1994), Dea and Belkin (1978), and Hoey (1991).

2.2 The Identification and Classification of Cohesive Features

The most influential description and classification of the cohesive devices available in the English language is arguably Halliday and Hasan's seminal work, *Cohesion in English* (1976). In their study, Halliday and Hasan (op.cit: 10-11) defined cohesion as *"the set of semantic resources for linking a sentence with what has gone before. (...) Where the interpretation of any item in the discourse requires making reference to some other item in the discourse, there is cohesion"*. The instances of cohesive relation between two items in a text are referred to as *ties*.

Halliday and Hasan (1976) have identified five different kinds of cohesive ties, namely *reference, substitution, ellipsis, conjunction*, and *lexical cohesion.* The first three kinds of ties (reference, substitution and ellipsis) are cohesive relations involving function, or grammatical words (Stubbs, 2001: 126) and are thus classified as instances of *grammatical cohesion*. The fifth kind of tie, lexical cohesion, is thus classified for mainly involving content, or lexical words (Stubbs, 2001: 127-8). Halliday and Hasan (1976: 6) classify the fourth kind of tie, conjunction, as a borderline case, "*mainly grammatical, but with a lexical component in it.*"

The different types of cohesive ties, Halliday and Hasan (1976: 2) claim, account for the range of possibilities available in the English language for creating what they call *texture*, or the property of *"functioning as a unit with respect to its environment.*" The manner in which each of these ties

contributes to creation of texture will now be examined.

Reference items are linguistic elements which make reference to something else for their interpretation. The reliance of such items on other elements in the text for the retrieval of their meaning is a factor in the formation of textual unity. Halliday and Hasan (1976) have identified three types of reference in English, namely personal, demonstrative, and comparative reference. Personal reference involves personal pronouns, possessive adjectives, and possessive pronouns. Demonstrative reference is realized by adverbials such as *here*, *there*, *now*, and *then*, demonstratives, and the definite article *the*. Finally, comparative reference items include adjectives and adverbs expressing identity, similarity, or difference, such as *identical*, *similarly*, and *different*. The different types of reference items can be categorized as exophoric, if involving situational reference, or endophoric, if involving textual reference. In the case of the latter type, they may be further categorized as either anaphoric, if referring to preceding text, or cataphoric, if referring to following text.

Substitution and ellipsis may be regarded as a single type of relation which takes two different forms. Substitution is the replacement of one item by another, and ellipsis, the replacement of one item by zero, or, simply put, the omission of an item. Substitution may involve the head of a nominal group (nominal substitution), the head of a verb group (verbal substitution), or an entire clause (clausal substitution). The words used as nominal substitutes are *one*, *ones*, and *same*. *Do* acts as verbal substitute, and *so* and *not* as clausal substitutes. Instances of substitution and ellipsis contribute to the creation of texture in that they form a connection with previous items in the

text either by means of their restatement, in the form of substitutes, or by their presupposition from context.

Halliday and Hasan's (1976: 227) description of conjunction as a cohesive device focuses on "*the function they have of relating to each other linguistic elements that occur in succession but are not related by other, structural means*," thus highlighting their texture forming character. In their scheme, four different categories of conjunction are identified, namely additive, adversative, causal, and temporal. The words *and, yet, so* and *then* are said to, respectively, typify these four general conjunctive relations. Conjunctive items which do not fall into any of these categories are referred to as continuatives.

The last type of cohesive relation in Halliday and Hasan's (1976: 274) taxonomy, lexical cohesion, is defined as "*the cohesive effect achieved by the selection of vocabulary*". The two main categories of lexical cohesion are reiteration and collocation. Reiteration involves the repetition of a lexical item by means of (a) same word, (b) a synonym or near-synonym, (c) a superordinate (item whose meaning includes that of the earlier one), or (d) a general word (e.g., *people*, *thing*). Unlike reiteration, collocation does not involve the repetition of a lexical item, but, rather, the association of items that regularly co-occur. Instances of collocation, according to Halliday and Hasan, may include, among other things, complementaries, such as *boy … girl*, antonyms, such as *wet … dry*, and converses, such as *order … obey*.

In addition to describing their cohesive model extensively, Halliday and Hasan (1976) also provide a systematic methodology of analyzing texts with the help of this analytical tool, which includes a coding scheme for the various

types of cohesion and a detailed sample analysis of seven short passages. In spite of its merits, however, the model admittedly had some limitations, particularly with regards to the relationship between cohesion and textual organization. This issue was addressed in a later paper by one of the authors. In this paper, Hasan (1984) develops on the notion of cohesive chains, which was only briefly described and exemplified in her earlier work with Halliday (1976).

Hasan (1984: 205) identifies two main types of chain, namely *identity chains* and *similarity chains*. Identity chains are formed by cohesive ties that share the same referents and have a text-bound semantic bond. Similarity chains, on the other hand, involve ties holding a semantic bond of co-classification (rather than co-reference), which is not text-bound. For instance, consider the following extract taken from a child's story in Hasan's data. The extract is here reproduced in an abbreviated form as presented in Hoey (1991: 15).

> "**1** *Once upon a time there was a little girl*
> ***2*** *and she went out for a walk*
> ***3*** *and she saw a lovely little teddy bear*
> ***4*** *and she took it home*
> ***5*** *and when she got it home she washed it*
> ***6*** *and she had the teddy bear many many weeks and years."*

Three identity chains and two similarity chains can be identified in this passage (Hoey, op.cit.: 15):

> **"*1*** *girl* ***2*** *she* ***3*** *she* ***4*** *she* ***5*** *she, she* ***6*** *she*
> ***3*** *teddy bear* ***4*** *it* ***5*** *it, it* ***6*** *teddy bear*
> ***4*** *home* ***5*** *home*"

As well, two similarity chains can be identified (Hoey, op.cit.: 15):

> **"*2*** *went out* ***5*** *got…home*
> ***4*** *took* ***6*** *had (both verbs describing possession in this context)*"

Hasan (1984: 212) claims that chains interact. She explains that this interaction occurs *"when two or more members of a chain stand in an identical*

functional relation to two or more members of another chain." She terms this phenomenon *cohesive harmony*. Her findings suggest that more insight into text may be achieved by considering the function of cohesive ties, rather than their nature and classification, and, more importantly, by considering their occurrence in combination, rather than isolated instances. The following subsection discusses those studies which have developed upon these assumptions and sought to describe cohesion functionally.

2.3 The Study of the Text-organizing Function of Cohesion

It has been argued (Section 2.2, above) that the study of the nature of cohesion in English, and the description and classification of its different instances, has provided valuable insights into the means through which texture is formed. As a further step, a number of studies have delved into the role of cohesion in the organization of written texts in English. This section offers a brief overview of a selection of these studies, including Winter (1977, 1979, 1982, 1994), Dea and Belkin (1978), and Hoey (1991).

2.3.1 Clause-Relation Theory

Rather than seeking to distinguish a variety of cohesive ties, Winter (1977, 1979, 1982, 1994) highlights the importance of recognizing their common function, which, he claims, is that of repeating other elements in a text. Repetition, Winter (1979: 101) claims, may take the form of easily noticeable partially repeated structures of the clause, or it may be *"disguised*

by the grammatical form it takes; that is, either by substitution, by deletion, or by a combination of both." It should be noted that Winter's use of the label *substitution* is in accordance with Quirk et al. (1972). Halliday and Hasan (1976) describe the same as *reference*. Note also that Winter understands *deletion*, or ellipsis, as an instance of repetition, a position shared by Hoey (1991), as will be seen later in this chapter, as well as in Chapter 4.

Winter (1977 et seq.) claims that instances of repetition arise from the kind of relation held between clauses. By *clause relations* he means the cognitive process whereby the meaning of a clause or group of clauses is interpreted in the light of its adjoining clause or group of clauses. *"Where the clauses are independent,"* the same phenomenon is termed "*sentence relations*" (Winter, 1994: 49). Winter identifies two types of clause/sentence relations: *logical sequence relations* and *matching relations*.

Logical sequence relations involve the observation of a change in time/space, including deductive sequence, such as in premise/conclusion. Clauses/sentences related by logical sequence are logically and/or temporally ordered and, therefore, do not require much repetition other than that necessary to maintain topic continuity, as in the following example (Winter, 1977: 10):

> The rifle clubs have banned the use of automatic and semi-automatic weapons. The move **follows** the police raids. (BBC Radio Commentator, 17 june 1967)

Matching relations, on the other hand, involve the matching or comparison of things, actions, people, etc., for similar or different features. The basis on which such comparison is made is marked by *"the repetition of key clausal elements and the replacement of others, which can be talked of in*

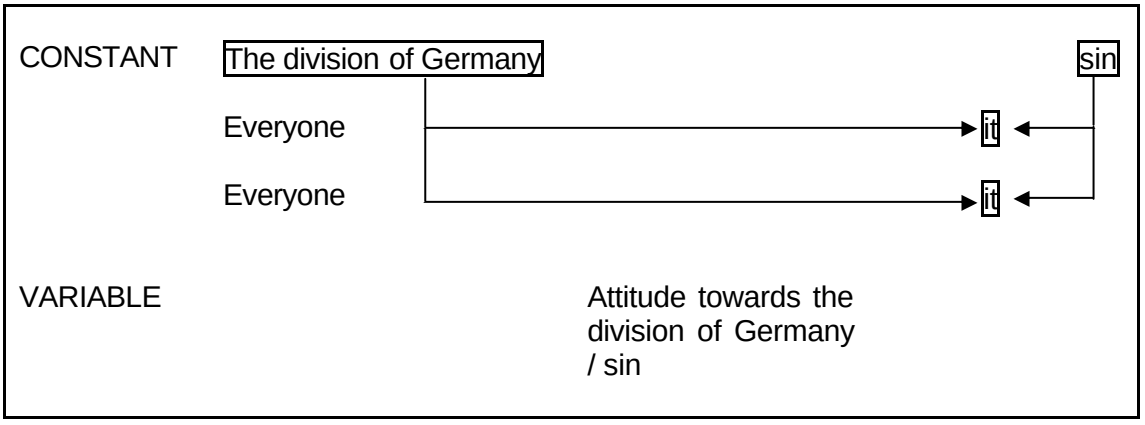
terms of patterns of constant and variable." (Hoey, 2005: 20) One simple example may be found in the following text (Winter, 1977: 72):

> The division of Germany is **rather like** sin. Everyone is against it; everyone assumes it is inevitable (Observer).

Typical semantic features of matching relations such as that in the example immediately above are *anticipation* and *lexical realization*. Winter (1977: 8) defines as anticipation instances where a clause *"makes explicit in advance what the next clause relation will be."* He, in turn, terms lexical realization the process of particularization of the elements anticipated by the previous clause.

In the example above, the first sentence introduces a simile which acts as the anticipatory member of the matching relation leading to the expectation that the similarities between *the division of Germany* and *sin* will follow. The clauses that follow meet such expectation and thus comprise the closing member of the relation, the lexical realization. Table 1 is a tabular representation of the constant/variable pattern of repetition connecting the clauses in question.

Table 1: Tabular Representation of Constant and Variable Elements



The boldface items in the examples offered above for logical sequence and matching relations (*follows, rather like*) make explicit the kind of relation held by the clauses in question. Winter (1977) classifies items such as these as belonging to one of three vocabularies of the clause-relating function: the subordinators (or *Vocabulary 1*), the sentence connectors (or *Vocabulary 2*), and certain lexical items (or *Vocabulary 3*).

Table 2 shows a selection of the members of each of the three vocabularies which are commonly used as markers of logical sequence and matching relations. A complete list of the three vocabularies as introduced by Winter (1977) may be found in Appendix I.

Table 2: A Selection of Markers of Logical Sequence and Matching Relations

	LOGICAL SEQUENCE RELATION	**MATCHING RELATION**
VOCABULARY 1 Subordinators	*after, although, before, because, by the time that, for, given that, when*	*although, however, whereas*
VOCABULARY 2 Sentence connectors	*as a result, consequently, firstly, finally, hence, secondly, thus*	*accordingly, alternatively, conversely, correspondingly, for example, on the other hand*
VOCABULARY 3 Lexical items	*consequence, follow, lead to, reason, subsequent*	*differ, distinguish, exemplify, exception, like, resemble, similarity*

Vocabulary 1 is formed by closed-system subordinators, which, according to Winter (1977: 14), may "*either connect clause with clause*" or "*embed one clause within another.*" Excluded from Winter's list of subordinators

were subordination by non-finiteness of the verb (when functioning as adjunct, subject, complement, or object), and the use of the subjunctive. Examples are, respectively, "*To escape, he broke down the door*," and "*Had he arrived, we would have left immediately.*" (Winter, 1977: 14, original emphasis) Winter (op.cit.: 14) explains that these were not considered *"on the grounds that they have no explicit item which **says** what their relation is.*" (original emphasis)

Vocabulary 2 is formed by adverbial adjuncts which are commonly used to connect sentences in sequence. These sentence connectors typically occur in the second member of the clause relation they mark.

Finally, Vocabulary 3 is formed by 108 open-system words which, Winter (1977: 2) claims, *"have similar semantic properties to closed-system items in sentence connection."* Among the properties these lexical items share with closed-system items (substitutes, in particular) is the fact that they require lexical realization from context, as in the following example adapted from Winter (1977: 76):

> But his measures failed to bite. The **result** is not surprising. *An impossible burden is being placed on the incomes policy*. [Vocabulary 3 item in bold. Lexical realization in italics]

Winter (1977) identifies four kinds of connective role assumed by Vocabulary 3 items: clause-relation connectors, meta-structure items, attitudinal function items, and anaphoric connectors. The first of these, clause-relation connectors, is the most abundant group, accounting for about 85% of all Vocabulary 3 items. Items within the clause-relation connector group, with few exceptions, can directly or indirectly paraphrase the semantics of Vocabulary 1 and Vocabulary 2 items, as in the following examples with clauses/sentences holding a logical sequence relation (adapted from Winter,

1977: 50, 49, 51, respectively):

> Mr. Wilson appealed to scientists and technologists to support his party. This is **how** he won so many middle class votes in the election. [Vocabulary 1]
>
> Mr. Wilson appealed to scientists and technologists to support his party. He **thereby** won many middle class votes in the election. [Vocabulary 2]
>
> Mr. Wilson's **way** of winning so many middle class votes in the election was to appeal to scientists and technologists to support his party. [Vocabulary 3]

The second connective role mentioned by Winter (1977) is covered by what he, in turn, labels the five *meta-structures*, also called larger clause-relation, items: *situation, problem, solution, observation,* and *evaluation*. The reason they are so termed is that the relations they represent "*may sometimes exist as clause relations within the unit of the paragraph*" (op.cit.: 19). In other words, meta-structure items act as signaling mechanisms of a common discourse pattern in written English, namely the *problem–solution* structure. Hoey (1994) describes a detailed discussion of each of the elements of this 'problem–solution pattern' and their different markers, including Winter's (1977) Vocabulary 3 items.

The third connective role of Vocabulary 3 items in Winter's (1977) description, defined *attitudinal function*, involves three lexical items and their derivatives, namely *attitude*, *expect*, and *surprise*. Finally, he includes a representative six lexical items in the fourth and last group, anaphoric connectors. These items are *action, event, do, happen, move*, and *thing*, along with their derivatives.

Winter's (1977, 1979, 1982, 1994) theory of clause relations has influenced a number of approaches to the analysis of textual organization in

English, three of which will be briefly discussed below.

2.3.2 Clause Relations Applied to Textual Analysis

In their 1978 paper, Dea and Belkin apply Winter's (1977) notion of clause/sentence relations to the semantic analysis of a scientific text. In their analysis, they focus on matching relations of *general/particular* (compatibility), *hypothetical/real* (contrast), and *denial/correction* (contrast), as well as logical sequence relations of *denial/reason, affirmation/reason*, and *cause/effect*. The results of their analysis suggest that clause relations

> *"tend to occur in multiples; that is, that one clause, sentence, or series of sentences can stand in a number of different relations to other parts of the text. (…) This type of multiple function appears to be a general characterization of text organization."* (Dea and Belkin, 1978: 73)

To exemplify, Dea and Belkin (1978: 73) point to the following sentences taken from their sample text:

> [3] A structure for nucleic acid has already been proposed by Pauling and Corey.
> [5] Their model consists of three intertwined chains, with the phosphates near the fibre axis, and the bases on the outside.
>
> [6] In our opinion this structure is unsatisfactory for two reasons:
>
> [13] We wish to put forward a radically different structure for the salt of deoxyribose nucleic acid.

Here, Dea and Belkin (1978: 73) point out, "*Sentence 13 is a correction of the denial in sentence 6 (matching contrast), and it also serves as part of the real*

opposed to the hypothetical of Sentences 3 and 5 (matching contrast)."

Dea and Belkin (1978) hypothesize that the clause relation approach to linguistic theory as exemplified in their paper may be capable of developing techniques or procedures for analyzing text in order to determine its significant elements. They suggest that sentences holding a heavy relational load, such as Sentence 13 above, are strong candidates for the most significant elements of the text. A similar claim has been put forward by Hoey (1991). His study, discussed in the following sub-section, highlights the role of lexical cohesion in the identification of closely related sentences.

2.3.3 The Analysis of Lexical Patterns

In his widely acclaimed book, *Patterns of Lexis in Text*, Hoey (1991) proposed to describe a new system of textual analysis based on the study of cohesion, specifically lexical cohesion. His approach is distinguished from that of previous works on lexical cohesion in that the attention is not primarily on itemizing cohesive features, but on observing how they combine to organize text. Another factor which distinguishes Hoey's aforementioned study from previous efforts in the field is the manner in which he attempts to represent the concept of text. In linguistics, as well as in other fields, metaphors are often used to describe or represent a new concept by means of its association with a familiar concept or experience. Hoey (op.cit.) claims that the 'metaphor of the sentence' is commonly applied to the study of text, leading to structural approaches to text, which seek to describe textual organization in terms of sentence structure. He suggests that this metaphor, which describes texts in terms of something smaller than a text, be supplemented with one which

describes a text in terms of something larger than a text, which he dubbed the 'collection of texts metaphor'. In his analogy, the collection of texts might be seen as consisting of a group of academic papers the relationship among which is marked by means of reference by citation, i.e. bibliographical or footnoted references. Similarly, non-adjacent sentences in a text may be said to 'cite' one another by means of reference by lexical repetition.

In order to check the validity of the 'collection of texts' metaphor, Hoey (1991) offers a complete description of a system of analysis of the lexical devices in non-narrative texts. In his system, Hoey (op.cit.) identifies as *links* the kinds of lexical relation which permit repetition across sentences. In addition to lexical relations he also considers a small set of cohesive devices which are not lexical in nature but which also make it possible for repetition to take place. The resulting categories of repetition are demonstrated in Table 3, below.

Table 3: Hoey's (1991) Categories of Repetition

<table>
<tr><th colspan="3">TYPES OF REPETITION</th></tr>
<tr><td rowspan="2">Lexical Repetition</td><td colspan="2">• Simple</td></tr>
<tr><td colspan="2">• Complex</td></tr>
<tr><td rowspan="3">Paraphrase</td><td colspan="2">• Simple</td></tr>
<tr><td rowspan="2">• Complex</td><td>Antonymous</td></tr>
<tr><td>Link triangle</td></tr>
<tr><td colspan="3">Superordinate / Hyponymic Repetition</td></tr>
<tr><td colspan="3">Co-reference</td></tr>
<tr><td colspan="3">Substitution</td></tr>
</table>

Hoey (1991: 37) establishes three as the minimal number of these links to be present in order for two sentences to be considered significantly connected, or *bonded,* as in the following example:

> [1] A drug known to **produce** violent reactions in humans has been **used** for **sedating grizzly bears** *Ursus arctos* in Montana, USA, according to a report in The New York Times.
> [2] After one **bear**, known to be a peaceable animal, killed and ate a camper in an unprovoked attack, scientists discovered it had been **tranquillized** 11 times with phencyclidine, or 'angel dust', which **causes** hallucinations and sometimes gives the **user** an irrational feeling of destructive power. (original emphasis)

Here, the two sentences are bonded by means of four links: *produce – causes* (simple paraphrase), *used – user* (complex repetition), *sedating – tranquilized* (simple paraphrase), and *grizzly bears – bear* (simple repetition).

Hoey (1991: 113) adds that *"sentences that have an unusually high level of bonding from the remainder … might be regarded as* ***central****"* to the development of the theme(s) of a text (original emphasis). Moreover, he claims that sentences forming the majority of its bonds with later sentences may be regarded as topic-opening sentences. Conversely, sentences forming the majority of its bonds with earlier sentences may be regarded as topic-closing. Batista (2002) claims that these notions may be useful in the analysis of multiple-choice reading comprehension tests in that they may provide a systematic means to connect questions and correct options to relevant sentences in the passage.

The methodology used in this research to analyze the corpus in question (16 official TOEFL® reading comprehension practice tests) was largely based on Hoey's (1991) aforementioned analytical system, the main features of which will be described and exemplified in detail in Chapter 4. In

the same chapter, a theory-based analytical tool for the analysis of cohesive relations in the Reading Comprehension Section of the TOEFL® will be proposed.

The chapter that follows will introduce the approach to the assessment of reading comprehension adopted in the tests in this corpus.

Chapter 3

The Assessment of Reading Comprehension in the Test of English as a Foreign Language â

3.1 Overview

The following chapter will introduce the methodology used in this research to analyze a corpus of 16 official TOEFL® reading comprehension practice tests. In this chapter, a description of both the content and the test method (Section 1.2, above) of the Reading Comprehension Section of the TOEFL® test is deemed necessary. The chapter will start with a justification of the choices made in the selection of the corpus. Finally, the concluding and larger portion of the chapter will offer a contrastive description of the three different editions of the tests in this corpus.

3.2 The Corpus in this Study

It has been mentioned earlier (Chapter 1) that this study aims to analyze the cohesive structure of a selection of official TOEFL® reading comprehension practice tests in order to investigate whether cohesive patterns in terms of testing purpose can be identified and, if so, whether these have any correlation with item difficulty. The corpus in this study is formed by official TOEFL® reading comprehension practice tests in the three different versions available at the time of data collection for this study, namely the

Paper-based TOEFL® test, the Computer-based TOEFL® test, and the Internet-based TOEFL® test (henceforth the TOEFL® PBT, CBT, and iBT, respectively). What is meant here by the term *official practice tests* is that these have been produced by the ETS, the non-profit organization that develops and administers the TOEFL® test, and have been "*taken from actual test forms given to examinees at worldwide test administrations.*" (ETS, 1998a: 4)

A large number of general practice materials for the TOEFL® test are readily available both online and at bookstores. However, for the sake of reliability, it was decided that this corpus should exclusively consist of retired official TOEFL® tests. As a result, a compromise has been made in terms of the size of this corpus. The newest version of the test, the TOEFL® iBT, has been recently released and, thus, very little practice material for this version of the test has been made available by the ETS. This corpus contains all of the official TOEFL® iBT reading comprehension practice tests available as of July, 2006 (exactly a year after the launching of the new test in the USA), which amounts to 16 sets, totaling 201 questions[1]. For the sake of harmony, an equivalent number of TOEFL® CBT and TOEFL® PBT official practice tests have been selected from the comparably larger body of practice material on these versions of the test. The tests in this corpus are distributed as shown in Table 4.

[1] It should be noted that the TOEFL® iBT reading items selected for this corpus have been taken exclusively from the Reading Comprehension Section of the test. Even though reading skills are also tested in combination with writing and speaking skills in the new integrated skills tasks introduced in this edition of the test, those tasks are part of the Writing and Speaking Sections and have thus been disregarded in the process of data collection for this study.

Table 4 Numbers in this Corpus

TEST VERSION	NUMBER OF SETS	NUMBER OF QUESTIONS
PBT	12	200
CBT	16	212
iBT	15	194
TOTAL	44	608

Table 4 shows the total number of sets and questions in this corpus. The term *set* refers to one passage and its accompanying group of reading comprehension questions.

The TOEFL® PBT edition tests in this corpus have been taken from *Practice Tests Volume 1* (2 complete tests) and *Practice Tests Volume 2* (2 complete tests), both official guides from ETS (1998a, 1998b, respectively). Each one of these tests is a complete test, i.e. a test reproduced in its original format, and is thus formed by 5 sets, with a total of 50 questions.

The TOEFL® CBT edition tests selected for this research have been taken from the *Powerprep CD-ROM* (2 complete tests), the *TOEFL® Sampler CD-ROM* (1 test), and *Online Reading Skills Builder Volume 1* (3 tests), all of which produced by the ETS (2000, 2002b, 2005b, respectively, the last of which only available online on the TOEFL® Practice webpage at www.toefl.org). Note that only the first two of these are complete tests, with 4 passages each and a total of 44 questions. The other four TOEFL® CBT tests in this corpus consist of selected sets taken from different original exams. The tests taken from the *Reading Skills Builder* (ETS, 2005b) are formed by sets with passages sharing common topics broadly classified as arts, life science, and physical science. Each of these tests contains 3 sets

and a total of 33 questions. The last TOEFL® CBT test, taken from the *TOEFL® Sampler CD-ROM* (ETS, 2002b), is intended to provide prospective test-takers with a sample of the kinds of passages and questions they are likely to encounter when taking the actual exam. This sample test is thus formed by the same number of sets as an original test, 4, but fewer questions, namely 25.

The TOEFL® iBT edition tests in this study have been taken from *Helping Your Students Communicate with Confidence* (ETS, 2005a), *The Official Guide to the New TOEFL iBT* (ETS, 2006a), and the *Complete Online iBT Practice Test* (ETS, 2006b: www.toefl.org). All of the tests in this group are reproduced in their original format and are thus each formed by 3 sets with a total of 36 to 42 questions.

The following sub-section will provide a description of the structure of the Reading Comprehension Section within the three different editions of the TOEFL® test.

3.3 The Reading Comprehension Section on the TOEFL® Test

According to the ETS, the reading comprehension section of the TOEFL® test is designed to measure a student's ability to read and understand short passages in English. Reading comprehension is the third section in both the TOEFL® PBT and the TOEFL® CBT, and the first section in the TOEFL® iBT edition of the test. It consists of several passages, each followed by a group of fixed-response questions. The following subsections

will discuss and compare these elements in the three versions of the TOEFL® test.

3.3.1 The Passages

The passages in the test are excerpts taken from college-level textbooks that would be used in introductions to a discipline or topic. They cover a range of very general academic topics broadly classified as related to the Arts, Humanities, Social Sciences, Physical Sciences, or Life Sciences. The ETS explains that the subject matter of the passages is general in nature "*so as not to give an advantage to specialists in particular fields of study, or to people with particular kinds of background knowledge*," thus contributing to the fairness of the test. (ETS, 2002a: 56)

The length of the passages varies across editions of the TOEFL® test. In both the TOEFL® PBT and the TOEFL® CBT, passages are between 250 and 350 words long, whereas in the new TOEFL® iBT, they are about twice as long, with an average of 700 words each. In all cases, however, the ETS (2002a: 56) maintains that *"sufficient context is provided by the passages so that examinees who read and understand them can answer the questions without relying on subject-specific knowledge outside the passage*."

Jamieson et al. (2000) describe the text material on the TOEFL® test by means of three basic features, namely grammatical, pragmatic, and discourse features. They briefly define grammatical features as relating to both the syntax of sentences and the vocabulary used in the text. Some of the syntactic features monitored in text selection involve the distribution of sentence types (simple, compound, complex, compound-complex), the

distribution of word classes (e.g., the frequency of nominalization typical of university texts), and the distribution of verb types (e.g., infinitives, actives) reflecting common usage in academic settings. Note, however, that for the purposes of planning task difficulty and developing reading comprehension item types for the TOEFL® test, these features are seen as playing a secondary role. Enright et al. (2000: 18), argue that "*the line of research on syntactic contributions to discourse processing does not typically propose that these are specific syntactic structures that would suggest the assessment of specific isolated structures.*" Rather, they add,

> "*the notion of syntactic support for reading comprehension rests more with the combined sets of signals that structural information provides: it contributes to efficient processing of information in working memory, it establishes and supports semantic relations between arguments and predicates for proposition information, and it adds contextual information to help disambiguate lexical meanings.*" (op.cit.: 18)

This set of signals characteristic of structural information involves, among other things, instances of both grammatical and lexical cohesion. This subject will be focused upon in Chapter 4.

Several of the properties of the vocabulary involved in the grammatical features described by Jamieson et al. (2000) include word frequency, semantic characteristics (e.g., the proportion of abstract and concrete nouns), and register features (e.g., the proportion of technical words specific to the

general topic of the text). In offering a reading framework for the TOEFL® 2000 project (a broad research effort commissioned by the ETS with the purpose of laying out of an improved test design to be put into effect as the new TOEFL® iBT edition), Enright et al. (2000) suggest that the role of vocabulary in determining task and item difficulty should be central. Unlike syntactic features, which, as mentioned previously, are tested indirectly as combined signals in the reading comprehension portion of the test, selected vocabulary items are tested directly and in isolation. In fact, as will be seen later in this chapter, vocabulary questions, where test takers are asked to select among four options that which is closest in meaning to a given word as used in the passage, are among the question types present in all of the editions of the test.

The second type of textual features mentioned by Jamieson et al. (2000), pragmatic features, are described as pertaining to the author's intent. To this effect, the same authors claim that the majority of the texts included in the TOEFL® test may be broadly classified as expository, which results in the dominant pragmatic function being "*to impart or seek factual information (exposition) or to present or defend an analysis (argument)*." (Op.cit., 2000: 17) An additional kind of text commonly found in academic settings, and which can be encountered in the TOEFL® test may be classified as historical / biographical narrative, which would include passages about the contributions of individuals to given disciplines.

Finally, discourse features are defined as relating to the nature and organization of the text as a whole. These include both rhetorical and text

organization[2] properties. In terms of their rhetorical properties, texts can be generally classified as definition, description, classification, illustration, cause / effect, problem / solution, comparison / contrast, regulatory, or analysis. It should be noted that these properties are not mutually exclusive, but rather complementary. Texts will often have both major and minor rhetorical properties. For instance, a text that is primarily descriptive may include one or more embedded definitions. This fact ties in with Winter's (1977, 1979, 1982, 1994) theory of sentence relations, discussed in Chapter 2, above, which is concerned with the role cohesive devices play in signaling the kind of relation held between sentences. It may be further argued that different rhetorical structures within a given text are both supported and marked by the kinds of relations held by its sentences. The same is true of text organization properties, which concern the ways in which different pieces of information in the text are related. As claimed by Jamieson et al. (2000: 19), "*text features that display relationships can be either typographical, such as headings and table layout, or syntactic, as when they are signaled by explicit discourse markers*." To these, Winter (1977, 1979, 1982, 1994) adds a selection of lexical items, or Vocabulary 3 items (See Section 2.3.1 above), which in most cases act as paraphrases of the more explicit syntactic markers of textual organization.

In common with grammatical features, pragmatic and discourse features may be tested either directly or indirectly. The following sub-section will provide a brief description of the testing purposes present in the three

[2] The term *text structure* is originally used in Jamieson et al. (2000) to refer to this discourse feature. However, in line with Hoey (1991: 267), the term *text organization* was preferred in the present study. The term *structure* presupposes a block-by-block built artifact, i.e., a combination of elements which is rule-bound and, thus, very largely predictable. In contrast, the pattern of combination of elements in texts is organized, not but rules, but by convention. For this reason, the term *organization* was felt to be a more appropriate choice to describe this discourse feature of texts.

editions of the TOEFL® test and the different types of questions related to these purposes.

3.3.2 The Test Items

The reading comprehension questions based on each of the passages serve a number of different testing purposes. The types of questions vary somewhat across versions of the TOEFL® test. As far as the test items on the TOEFL® PBT are concerned, the ETS mentions that they focus on a variety of reading skills. These skills have been here numbered for ease of reference (ETS, 2002a: 56):

1. *"Identify the main topic or the main idea of the passage as a whole or of one of the paragraphs;*
2. *Understand some of the details contained in the passage;*
3. *Understand the relationships between the ideas in the passage;*
4. *Make inferences based on information that is directly stated in the passage;*
5. *Identify meaning of some vocabulary;*
6. *Understand the referential relationships in the passage;*
7. *Recognize why an author mentions a particular piece of information;*
8. *Identify the organizational structure of a passage (e.g., compare / contrast, define, chronological sequence);*
9. *Use the information in the passage to predict how the passage would most likely continue."*

Although representative of the tasks a test-taker is most likely to encounter in the paper-based edition of the TOEFL®, the list above is not necessarily

comprehensive. There is an additional small group of tasks mentioned by Phillips (2001), the first two of which occur in the TOEFL® PBT practice tests in this corpus with considerable frequency. These questions ask examinees to:

- *"Identify among the options given information that is not mentioned or not true in the passage;"*
- *"Determine where in the passage a piece of information is found;"*
- *"Identify the tone of the passage or the author's attitude."* (Op.cit.: 385, 431, 435, respectively)

Table 5 includes a resulting list of 12 test items involving all of the reading skills above. Examples have been selected from practice tests in this corpus (ETS, 2002a) and reprinted by permission of Educational Testing Service, the copyright owner.

Table 5 Test Items in the Reading Section of the TOEFL® PBT

TEST ITEMS		EXAMPLES
1	Main Idea	*"With what topic is the passage primarily concerned?" "What is the author's main point in the first paragraph?"*
2	Stated Detail	*"According to the passage, in what circumstances …"*
3	Sentence/Clause Relation	*"The word "Yet" in line 13 indicates that what follows is …"*
4	Inference	*"Which of the following can be inferred from the phrase …"*
5	Vocabulary	*"The word "inaccessible" in line 3 is closest in meaning to …"*
6	Reference	*"The word "they" in line 16 refers to …"*
7	Information Purpose	*"Why does the author mention …"*
8	Organizational Structure	*"The passage is organized by …"*
9	Prediction	*"The paragraph following the passage most probably discusses …"*
10	Unstated Information	*"The passage mentions all of the following EXCEPT …"*
11	Locate Information	*"Where in the passage does the author mention …"*
12	Tone	*"Which of the following best describes the author's tone in the last paragraph of the passage?"*

The reading section on the computer-based version of the TOEFL® test features the same items as the paper-based test. However, it targets an

additional skill, namely 'to determine where a particular piece of information should be inserted in the passage'. Moreover, this edition of the test features questions in three different formats:

a) Multiple-choice questions: These are traditional format questions (such as those in the TOEFL® PBT edition) in which examinees are given four options to choose from in response to a question or directive, as in the following vocabulary question:

"The word driven in the passage is closest in meaning to
▢ pushed
▢ smoothed
▢ controlled
▢ strengthened" (ETS, 2000)

b) Click-on questions: These questions require the test-taker to find a word, phrase, sentence, or paragraph in the passage that answers the question. In this type of question, the examinee selects an answer by clicking on it with the mouse. Note that in such cases options are often not highlighted in the passage, as in the following vocabulary question:

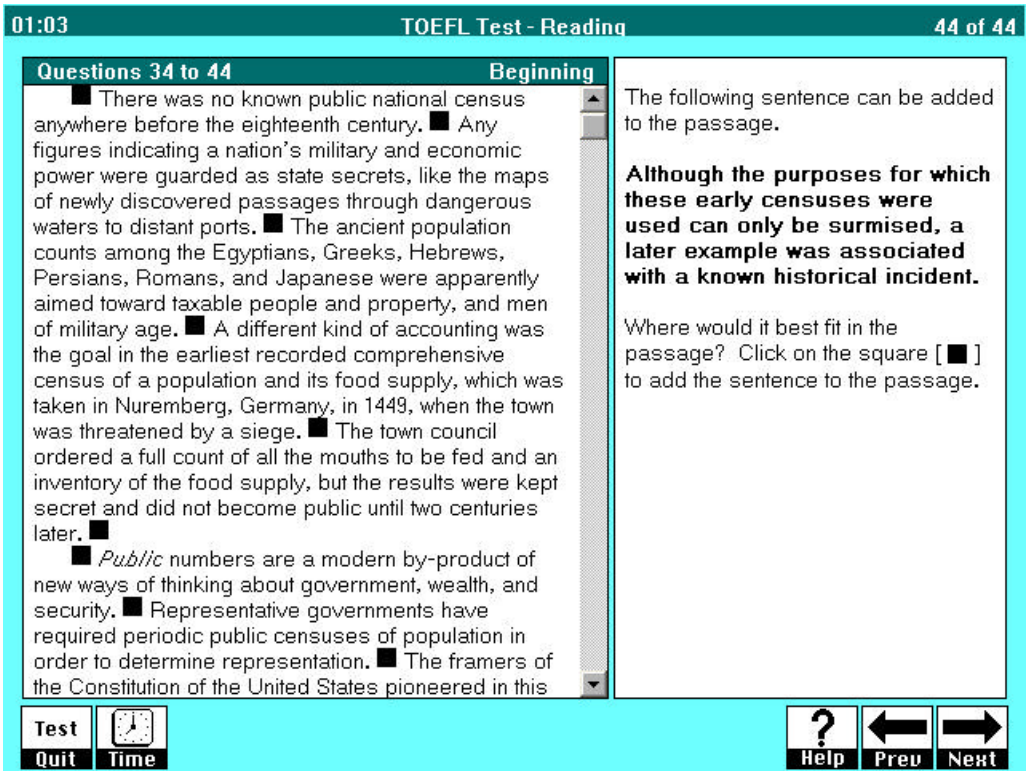
"Look at the word rare in the passage. Click on the word in the bold text that has the same meaning.

The Southwest has always been a dry country, where water is scarce, but the Hopi and Zuni were able to bring water from streams to their fields and gardens through irrigation ditches. Because it was so rare, yet so important, water played a major role in their religion. They developed elaborate ceremonies and religious rituals to bring rain." (ETS, 2002b)

This example, along with that for multiple-choice questions above, demonstrate that, in the TOEFL® CBT, given skills, in this case 'to identify the

meaning of a word in the passage', may be tested by means of different question formats.

c) Insert questions: These questions require that the examinee find the most logical place in a portion of the passage to insert a given sentence, as in this example (ETS, 2000):



Finally, regarding the reading comprehension questions in the new internet-based version of the TOEFL®, the ETS (2005a) divides them into 3 categories: *Basic Comprehension, Inferencing,* and *Reading to Learn*. The Basic Comprehension category has 5 question types which involve the assessment of vocabulary, sentence structures, semantic abilities, and the ability to understand important information presented in the passage. The Inferencing category has 3 question types and involves the assessment of the

ability to connect information across multiple parts of the test, as well as the recognition of the organization and purpose of the text. Finally, the Reading to Learn category, with 2 question types, concerns the ability to distinguish major from minor points, as well as classify, categorize, and organize information in the passage. Table 6 shows the 10 different question types on the TOEFL® iBT.

Table 6 Question Types in the Reading Section on the iBT

CATEGORIES	QUESTION TYPES	
Basic Comprehension	1	Factual Information questions
	2	Negative Factual Information questions
	3	Vocabulary questions
	4	Reference questions
	5	Sentence Simplification questions
Inferencing	6	Inference Questions
	7	Rhetorical Purpose Questions
	8	Insert Text Questions
Reading to Learn	9	Prose Summary Questions
	10	Fill in a Table Questions

Three of these question types are new tasks being introduced in the TOEFL® iBT, namely *Sentence Simplification, Prose Summary,* and *Fill in a Table* questions. In sentence simplification questions, examinees are asked to "*choose a sentence that has the same essential information as a sentence that occurs in the passage*." (ETS, 2006a: 28) For this task, the target sentence in the passage is highlighted and the following fixed directive is shown (ETS, 2005a, 2006a, 2006b):

> Which of the following best expresses the essential information in the highlighted sentence? *Incorrect* answer choices change the meaning in important ways or leave out essential information.

The next two newly included tasks in the TOEFL® iBT are those making up the Reading to Learn category. The ETS (2006a: 32) avers that "*each reading passage will have only one Reading to Learn item. It will either be a Prose Summary or Fill in a Table item, never both*."

Prose Summary questions are intended to measure the test taker's ability to "*understand and recognize the major ideas and the relative importance of information in a passage*." (ETS, 2006a: 32) Distractors will often involve minor ideas, or even ideas not mentioned in the passage. The correct options will synthesize and paraphrase major ideas in the passage. Because this kind of question involves the whole passage, it is usually the last in the set, and is worth 2 points. Six options are given, three of which have to be chosen. Because this type of task involves multiple correct answer choices, it allows partial credit for partially correct answers. The test-taker has to choose at least two correct options in order to earn one point, and the three correct options, in any order, to earn the full two points the item is worth in total. The following is an example of a Prose Summary question in this corpus.

Directions: An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. *This question is worth 2 points*.

Scholars have wondered about the meaning of the subjects, location, and overpainting of Lascaux cave images.

- .
- .
- .

Answer Choices

1] The paintings may have recorded information about animal migrations, and may only have been useful for one migration at a time.

2] The human figures represented in the paintings appear to be less carefully shaped than those of animals.

3] It is possible that the animals in the paintings were of mythical significance to the tribe, and the paintings reflected an important spiritual practice.

4] Unlike painters of the recently discovered paintings, other cave painters usually painted on rocks near cave entrances or in open spaces outside the caves.

5] Some scholars believe that the paintings motivated hunters by allowing them to picture a successful hunt.

6] Scientific analysis suggests that paintings were sprayed onto the rock walls with tubes made from animal bones.

(ETS, 2005a: 157)

The second type of Reading to Learn items is Fill in a Table. In Fill in a Table items, the test taker is given "*a partially completed classification table based on information in the passage*." (ETS, 2006a: 35) These are intended to measure the students' ability to organize and categorize main ideas in the passage. For this reason, this test item will only be present in sets about passages that "*have more than one focus of development in that they include more than one point of view or perspective*." (op.cit.: 35) As occurs in Prose Summary items, correct options will paraphrase or synthesize sentences introducing major topics in the passage. Tables may have 2 or 3 columns or

rows containing bullets marking where the 5 or 7 answer choices have to be placed. Fill in a Table items with 2 columns or rows are worth 3 points and are accompanied by up to seven options, five of which are to be chosen. The test-taker has to choose a minimum of three correct answers to earn one point, four correct options to earn two points, and the five correct options to earn the full three points. Tables with 3 rows or columns are worth 4 points and are accompanied by up to nine options, of which the test taker has to choose seven. At least four correct options have to be chosen for a one-point credit, five correct answers for two points, six correct for three points, and all seven correct options for a full 4-point credit. The following is an example of a Fill in a Table question with seven correct answers:

Complete the table by matching the phrases below
Directions: Select the appropriate phrases from the answer choices and match them to the type of organism to which they relate. TWO of the answer choices will NOT be used. ***This question is worth* 4 *points.***

Drag your answer choices to the spaces where they belong. To remove an answer choice, click on it. To review the passage, click on **View Text**.

Answer Choices

1] Vary frequently the amount of energy they spend in body maintenance	**Opportunists**
2] Have mechanisms for protecting themselves from predation	•
3] Succeed in locations where other organisms have been removed	•
4] Have relatively short life spans	•
5] Invest energy in the growth of large, strong structures	•
6] Have populations that are unstable in response to climate conditions	**Competitors**
7] Can rarely find suitable soil for reproduction	•
8] Produce individuals that can withstand changes in the environmental conditions	•
9] Reproduce in large numbers	•

(ETS, 2005a: 152-153)

The remaining seven question types on the TOEFL® iBT are also featured in the previous editions of the TOEFL® test. However, some of the reading tasks on the TOEFL® PBT and the TOEFL® CBT have not been added to this new version of the test. The following comparative table (Table 7) shows a complete list of the test items in the three versions of the test, and indicates which ones overlap.

Table 7 Comparative Table of TOEFL Reading Comprehension Questions

	QUESTION TYPES	PBT	CBT	iBT
1	Main Idea	✓	✓	
2	Factual Information*	✓	✓	✓
3	Sentence/Clause Relation	✓	✓	
4	Inference	✓	✓	✓
5	Vocabulary	✓	✓	✓
6	Reference	✓	✓	✓
7	Rhetorical Purpose**	✓	✓	✓
8	Organizational Structure	✓	✓	
9	Prediction	✓	✓	
10	Negative Factual Information***	✓	✓	✓
11	Locate Information	✓	✓	
12	Tone	✓	✓	
13	Insert Text		✓	✓
14	Sentence Simplification			✓
15	Prose Summary			✓
16	Fill in a Table			✓

* Also called Stated Detail questions
** Also called Information Purpose questions
*** Also called Unstated Detail questions

It may thus be inferred, from the content and method of the tests described in this chapter, that cohesion is tested both directly and indirectly in the Reading Comprehension Section of the TOEFL® test. The next chapter will build upon the role of cohesion awareness in the successful completion of the test items involved, and provide a detailed

description of the analytical tools selected for the present research in terms of the analysis of the chosen tests in the corpus of this thesis.

Chapter 4

A Theory-based Analytical System for the Study of Cohesive Relations in Reading Comprehension Tests

4.1 Overview

The previous chapters have both introduced the principal aim of this study, namely to analyze the lexical cohesive organization of the reading comprehension section of a standardized proficiency test in English (Chapter 1), reviewed a selection of the literature on the core subject of the research questions motivating this study, cohesive relations in English (Chapter 2), and, in addition, described the content and method of the tests making up the corpus of this research, 16 TOEFL® reading comprehension practice tests (Chapter 3).

This chapter will introduce the methodology employed to pursue the aims of this study. The initial and major portion of the chapter will focus on research questions *a* and *b*, which propose the hypothesis that it may be possible to identify cohesive patterns connecting test items to relevant excerpts in the passages in question, and that these patterns may hold across different versions of the test. Using Hoey's (1991) repetition model, briefly discussed in Chapter 2, as an analytical starting-point, a theory-based tool for the analysis of cohesive relations in the tests in this corpus will be proposed. The latter part of the same chapter will, in turn, focus on research question *c*, which, in the event of the aforementioned hypotheses being confirmed, further

speculates whether a correlation between cohesive patterns and item difficulty may be observed. The framework used in this study for the assessment of the level of difficulty of reading comprehension tasks, based on Jamieson et al. (2000), will then be described, followed by an introduction to this framework's related additive scoring rubric.

4.2 The Starting Point: Hoey's (1991) Repetition Model

Hoey (1991) proposed to describe a model of textual analysis which focuses on the study of the text-organizing function of lexical cohesion. This model, he argues, seeks to combine the notions of *cohesive harmony* (Hasan, 1984), *sentence/clause relations* (Winter, 1977, 1979, 1982, 1994), and *long-distance lexical relations* (Phillips, 1985). These notions, stemming from studies involving the text-organizing function of cohesion (Hasan and Winter) and collocation (Phillips), will be discussed in the following sub-section.

4.2.1 Theoretical Influences on Hoey's (1991) Repetition Model

It has been argued, in Chapter 2 above, that by *cohesive harmony* Hasan (1984) means the property of text resulting from the interaction of *cohesive chains*, or the phenomenon whereby a cohesive element refers back to an item that is itself cohesive with a still earlier item, and so forth (Halliday & Hasan, 1976). The focal point in Hasan's (1984) study, as far as Hoey's (1991) approach to the study of lexical cohesion is concerned, is that it suggests that cohesive elements should be considered functionally and in combination. As Hasan (1984: 219) claims,

> *"a clause by clause, or a proposition by proposition analysis of a text will not reveal the nature of coherence in texts. When, however, a functional relation of the same type is mapped on lexical tokens which are already united by their internal similarities, and this relation is echoed, then the semantic bond between the components of the messages of the text is greatly augmented."*

Even though Hasan's (op.cit.) approach sheds more light into textual organization than previous, purely classificatory, studies on cohesion, she admits that it still fails to explain the relationship between cohesion and the logical relations connecting sentences as wholes. This subject has been taken up by Winter (1977, 1979, 1982, 1994), whose clause-relation theory was also briefly discussed in Chapter 2.

In his study *Clause-Relational Approach to English Text*, Winter (1977) examines a class of open-system words (e.g., nouns, verbs, adjectives) and suggests that they, in common with subordinators and sentence connectors, *"can function as exponents of a clause relation, and as such can have a predictive effect on the organization of written discourse."* (op.cit.: 1) Winter adds that instances of repetition arise from the kind of relation held by clauses. In effect, one of the points highlighted by Hoey (1991: 20) in Winter's approach is that it suggests that *"there is an informational value to repetition, in that it provides a framework for interpreting what is changed.*" It should be noted that Winter's (1977) notion of *repetition* is much broader than Halliday and Hasan's (1976) category of *reiteration*, discussed in Section 2.2, above.

In addition to lexical repetition, Winter (op.cit.) includes as repetition instances of substitution (Halliday and Hasan's *reference*) and ellipsis, a position reflected in Hoey's (op.cit.) own repetition model.

A final point which Hoey draws attention to in Winter's (1994: 20) theory is the proposition that "*relations between sentences established by repetition need not be adjacent and may be multiple*." This issue is further developed by Phillips (1985), although from a different perspective.

Phillips' (1985) starting-point differs considerably from that of Winter's (1977) and Hasan's (1984) given that Phillip's work fails to include lexical cohesion, per se. Rather, it describes the nature of collocation and its contribution to the organization of book-length texts[1]. Phillips (op.cit.) claims that the lexical inventory of a text is tightly organized in terms of collocation and that this, in turn, makes possible the identification of topic introduction, topic closure, and even the text's general pattern of organization. Hoey (1991: 21) argues that of particular relevance to studies of cohesion is Phillips' finding that words often intercollocate, i.e., if word *a* collocates with words *b, c,* and *d* in a given text, there is a reasonable chance that word *b* might also collocate with *c* and *d*, and so forth. This phenomenon allowed Phillips (1985) to represent the intercollocations as networks of connections in chapter-length stretches of text. In drawing a connection between this discovery and the cohesive system in English, Hoey (1991: 21-22) argues that "*it is self-evident that for a collocation to be establishable there must first be some repetition of the relevant words*." Thus, he reasons that Phillips' representation of networks

[1] Even though collocation is mentioned in Halliday and Hasan's (1976: 284-291) work on cohesion, and, subsequently, in Halliday and Matthiessen's (2004: 574-578) description of lexical cohesion within their volume on Systemic Functional Grammar, very little emphasis and space is given to this important text-forming instance of lexical cohesion in either volume.

of connections should be equivalent to a crude measure of the interconnectedness of cohesive chains. Furthermore, he concludes that

> *"it is possible to interpret Phillips' findings as meaning that chapters are connected by lexical cohesion and that the connection has organizational significance. If such an interpretation is reasonable, it implies that, understood aright, cohesion is of the greatest importance in text organization."* (Hoey, 1991: 25)

Hoey's (op.cit.) repetition model attempts to demonstrate the correctness of this implication. The following sub-section will describe the main features of this model.

4.2.2 Hoey's (1991) Categories of Repetition

According to Hoey (1991), each sentence in a text contains items which either repeat items from previous sentences or are repeated in the sentences that follow the same. He identifies as *links* the kinds of lexical relation which permit repetition, as well as a small set of cohesive devices which are not lexical in nature but which also make it possible for repetition to take place. He has identified five main categories of repetition, namely [1] *lexical repetition*, [2] *paraphrase*, [3] *superordinate / hyponymic repetition*, [4] *co-reference*, and [5] *substitution*. The manner in which each of these types of links contributes to textual organization will now be examined, with examples drawn from passages taken from tests in the corpus of this thesis.

Sentences are numbered for ease of reference.

The first type of link identified by Hoey (1991), lexical repetition, is similar to Halliday and Hasan's (1976) subcategory of reiteration, repetition. Hoey (op.cit.) classifies instances of lexical repetition as simple or complex. Simple lexical repetition (henceforth, simple repetition) involves items which Hoey (op.cit.: 55) defines as "*formally identical*", i.e., items sharing the exact same form or the same morpheme with minimum alterations, such as those marking the plural form of a noun, or those marking the 3rd person singular, simple past, past participle or gerund forms of a verb. Complex lexical repetition (henceforth complex repetition), on the other hand, occurs "*either when two lexical items share a lexical morpheme, but are not formally identical (as defined in our discussion of simple repetition), or when they are formally identical, but have different grammatical functions*." (op.cit.: 55) The following are examples of simple repetition and complex repetition links in this corpus (ETS, 2002b; 2005a: 150, respectively):

> **Simple Repetition**
> **[2]** In order to answer this question, it may be useful to distinguish between the ***physical***, mental, and social preconditions that were necessary.
> **[3]** No doubt such ***physical*** features as erect posture and the concomitant aptitude for carrying objects in the hand and manipulating them were essential.

> **Complex Repetition**
> **[5]** All organisms, therefore, ***allocate*** energy to growth, reproduction, maintenance, and storage.
> **[6]** No choice is involved; this ***allocation*** comes as part of the genetic package from the parents.

The second category of repetition in Hoey's (1991) taxonomy, paraphrase, involves the repetition of the idea represented by a given lexical

item, rather than its form. In common with lexical repetition, instances of paraphrase may be either simple or complex. Simple Paraphrase may be associated with Halliday and Hasan's (1976) sub-category of reiteration, synonymy. It occurs whenever "*a lexical item may substitute for another in context without loss or gain in specificity and with no discernible change in meaning.*" (Hoey, 1991: 62) One example of simple paraphrase is:

> **Simple Paraphrase**
> **[4]** Even before humans could make fires themselves, one of the advantages that they (and possibly other primates as well) had over other animals was that they were able to handle sticks with which they could ***rummage*** in the smoldering fire without getting burned.
> **[5]** After a forest fire they were able to ***search through*** the ashes for food and probably noticed that they might prolong the fire's burning by throwing branches on it. (ETS, 2002b)

In Hoey's (op.cit.) categorization, instances of complex paraphrase may be antonymous, or members of a *link triangle*. Complex antonymous paraphrase involves antonyms that do not share a morpheme with the items they link with, as in the following example:

> **Complex Antonymous Paraphrase**
> **[6]** The principle is simple: in any net with mesh of a given size, some fish will be caught while smaller fish will slip through and ***escape***.
> **[7]** By regulating the size of the mesh so that fish above a certain size will ***be caught***, the survival of the immature fish is, in theory, assured. (ETS, 2002b)

Note that in Hoey's (op.cit.) analytical system, antonyms formed by the addition of a prefix to the same morpheme as the items with which they form links are picked up by the definition of complex repetition, above, and are thus not counted as complex antonymous paraphrase. Examples offered by Hoey (op.cit: 64) include *happy – unhappy*, *audible – inaudible*, and

contented – discontented, all of which are categorized as instances of complex repetition.

The second form of complex paraphrase identified by Hoey (1991: 65) is the *link triangle*, which, he explains, occurs when "*the presence of two types of link creates a third*," as in the following example:

> **[1]** What is it that enabled early humans to control the use of fire; first to keep a fire growing for an extended length of time and then to be successful in passing on this ***ability*** from generation to generation?
> **[3]** No doubt such physical features as erect posture and the concomitant ***aptitude*** for carrying objects in the hand and manipulating them were essential.
> **[4]** Even before humans could make fires themselves, one of the advantages that they (and possibly other primates as well) had over other animals was that they were ***able*** to handle sticks with which they could rummage in the smoldering fire without getting burned. (ETS, 2002b)

Here, *ability* and *aptitude* form a simple paraphrase link, and *ability* and *able* form a complex repetition link. Therefore, *aptitude* and *able* will form a complex link-triangle paraphrase link. However, Hoey (1991) adds, there will be situations in which one of the elements of the triangle is missing. He argues that a link may be acknowledged between the two items present in the text if certain conditions are met:

> *"there must be an item that is capable of paraphrasing exactly in that context one of the items and of repeating the other. In other words, the missing item has to be such that if it were to be substituted for the item it paraphrases there could be no discernible difference in our interpretation of the text."* (op.cit: 66)

Thus, if, for instance, a text contains the words *teacher* and *instruction*, these may be considered to form a link, given that the missing item, *teaching*, can substitute exactly for *instruction* in this context.

Superordinate and hyponymic repetition account for cases when two items are interpreted as having identical referents. These links occur when the items sharing the same referent are connected by a lexical relation of class membership. Superordinate repetition involves a general term which may be said to designate a class of which the earlier item is a member, as in the following example:

> **Superordinate Repetition**
> **[10]** Cave ***paintings*** in France and Spain, however, are in recesses and caverns far removed from original cave entrances.
> **[13]** Since cave dwellers normally lived close to entrances, there must have been some reason why so many generations of Lascaux cave dwellers hid their ***art***. (ETS, 2005a: 154)

Conversely, hyponymic repetition involves a specific term which may be said to be a member of, or included in, the class designated by the earlier item forming the link. The following is an example of a hyponymic repetition link in this corpus:

> **Hyponymic Repetition**
> **[6]** ***Methods of applying color*** varied: some colors were brushed or smeared on rock surfaces and others were blown or sprayed.
> **[7]** It is possible that tubes made from animal bones were used for ***spraying*** because hollow bones, some stained with pigment, have been found nearby. (ETS, 2005a: 154)

Co-reference links, in common with superordinate and hyponymic repetition, involve items sharing the same referent. Unlike those, however, co-reference items do not hold a lexical relation, and, thus, the link between them is context-dependent. An example of a co-reference link in this corpus

is:

> **Co-Reference**
> **[1]** ***Tunas, mackerels, and billfishes*** (marlins, sailfishes, and swordfish) swim continuously.
> **[3]** As a result, practically every aspect of the body form and function of ***these swimming "machines"*** is adapted to enhance their ability to swim. (ETS, 2006a: 90)

Finally, substitution is the only type of link in Hoey's (1991) model which incorporates grammatical members of closed systems (a full list of which may be found in Appendix II) whose function is to stand in, or substitute, for lexical items. Hoey (op.cit.) notes that he uses the term *substitution* following Quirk et al. (1972). Most of the items accounted for by this category are described by Halliday and Hasan (1976) as instances of reference. Citing Emmott (1989), Hoey (op.cit: 71) justifies his choice by arguing that "*a pronoun, for example, does not refer to an earlier item, but co-refers with the earlier item to something real or imaginary outside the text*." However, the differences between Halliday and Hasan's reference and Hoey's substitution go beyond the realm of terminology. In addition to personal and demonstrative pronouns, Halliday and Hasan (1976) include demonstrative adjectives, modifiers, and the definite article *the* in their reference category. Because the function of these additional items is largely to draw attention to the givenness of one or more lexical items, rather than to stand in for them, they have not been included in Hoey's (1991) categorization. One exception in this regard is the use of the demonstrative adjectives *this, that, these*, and *those* to modify a noun which is not a lexical repetition or a paraphrase of a previous item. Hoey (op.cit.: 270, note to page 72) avers that "*in such instances ¾ and only in these instances ¾* ***this*** *(or that; these or those)*

is treated as repetition, the category being labeled ***deixis***." (original emphasis) Examples of deictic repetition which Hoey mentions as being accounted for in his categorization are *this argument* or *this claim*, where one or more previous sentences are summarized in the words *argument* and *claim*.

Halliday and Hasan (1976) use the term *substitutes* to refer to a small class of items, some of which are also included in Hoey's (1991) categorization. One of these items is *one*, when used as a nominal head accompanied by modifiers, as in *the first one* and *another one*. When used by itself, however, *one* would not count as a substitution link. Rather, it would be treated as accompanying ellipsis (discussed below).

Other items accounted for in Hoey's (1991) substitution category are *do (it/the same/this/likewise/so);* the clausal *so* and *not*, as in *they said so* and *they said not;* and *(the) same*, when not accompanying an item (repeated or otherwise).

One final instance of substitution considered by Hoey (1991) is ellipsis, where Ø substitutes for a lexical item. Consider the following example:

> **Ellipsis**
> **[8]** Mesh regulation is now an important part of fishery control, but it still has its ***imperfections***.
> **[9]** One ***Ø*** derives from the fact that different fish of different species vary in size — a mature whiting, for example, is about the same size as an immature cod, so that a net designed to allow young cod to escape will also permit mature and perfectly saleable whiting to get away. (ETS, 2002b)

Here, Ø, rather than the modifier *one*, acts as the second member of the substitution link formed with *imperfection*. A comparative table providing a full list of the items within Hoey's (1991) substitution category and the place of the same items within Halliday and Hasan's (1976) categorization may be

found in Appendix II.

Hoey (1991: 42) argues that substitution items, "*while connecting certain sentences, obscure the connections between other sentences*." Thus, in order to allow for a thorough analysis to be carried out, all sentences in the text must be effectively rendered contextually more neutral. This may be done by replacing non-lexical cohesive features, as well as ellipsis, with the full forms for which they are a shorthand. To exemplify, consider the following sentence in this corpus followed by its adapted, formatted version (full forms are in square brackets):

> **[13]** ***This*** is not to say ***they*** were acting "unselfishly".
>
> **[13]** <***This***> [The fact that early humans would collect fuel over larger distances and devote part of their energy to maintaining something outside themselves, something beyond their immediate needs – sentence 12] is not to say <***they***> [early humans] were acting "unselfishly". (ETS, 2002b)

The categories of repetition discussed above are the basis of Hoey's (1991) analytical system. The sub-section that follows will introduce the method of analysis employed in the application of this system.

4.2.3 Hoey's (1991) Method of Analysis

The links discussed in Section 4.2.2, above, in their different instances, mark points of reference between sentences. Hoey (1991) establishes three points of reference as the minimal number of references for two sentences to be considered significantly connected, or *bonded*. However, he adds that in some cases three links may not be sufficient to form a bond between two sentences. Given that the cut-off point of a text is marked by a degree of

repetition cases which is above average, it is "*related indirectly and uncertainly to the relative length and lexical density of the sentences of the text in question*." (op.cit:92)

For the purposes of recording links, Hoey (1991: 83) establishes that

> *"an item may only make one link per sentence (though there is no limit to the number of sentences it may make a link with). If an item repeats two items from another sentence, then only one is registered. Conversely if a sentence contains two items, both of which repeat an earlier item, again only one link is recorded."*

In cases where two or more items repeat one item in the previous sentence, Hoey (op.cit) suggests that the strongest link be recorded. The following list, adapted from Hoey (op.cit.: 83), presents the weight assigned in his study to the various categories of links in decreasing order of importance:

1 Simple Repetition
2 Complex Repetition
3 Simple Paraphrase
4 Complex Antonymous Paraphrase
5 Complex Link-triangle Paraphrase
6 Superordinate / Hyponym
7 Substitution
8 Co-Reference
9 Ellipsis

Consider the following example:

> **[2]** In 1994 there were nearly 20,000 ***wind*** turbines worldwide, most grouped in clusters called wind farms that collectively produced 3,000 megawatts of electricity.
> **[3]** Most Æ **<*wind*>** farms were in Denmark (which got 3 percent of its electricity from ***wind*** turbines) and California (where 17,000 machines produced 1 percent of the state's electricity, enough to meet the residential needs of a city as large as San Francisco). (ETS, 2005a: 158)

Here, the simple repetition link would be recorded, and the ellipsis link ignored.

Once links are recorded and bonds between sentences are established, *nets*, or sets of bonded sentences, can be identified. These nets allow for a) the identification of marginal and central sentences, b) the creation of summaries of the content of a passage, and c) the identification of topic-opening and topic-closing sentences.

Marginal sentences are characterized by a very low number of bonds formed with other sentences. Conversely, central sentences are marked by an above average number of bonds formed with other sentences. It has been suggested that central sentences may be grouped together in order to form readable summaries of non-narrative (Hoey, 1991) or marginally narrative texts, i.e., those *"narratives whose organization derives from neither causality nor sequentiality."* (Shepherd, 1993: 282).

Finally, topic-opening sentences are characterized by forming most or all of their bonds with subsequent sentences, whereas topic-closing sentences form most or all of their bonds with previous sentences.

The following section will discuss how Hoey's (1991) analytical system has been adapted to the purposes of this research.

4.3 A Theory-based Tool for the Analysis of Lexical Cohesive Patterns in Reading Comprehension Tests

It has been stated that Hoey's (1991) repetition model was originally devised to identify the links bonding both adjacent and non-adjacent sentences within mainstream non-narrative texts. However, Batista (2002) and MacMillan (2006) suggest the same system may be applied to identify bonds between multiple-choice reading comprehension test items and relevant sentences in the passages in question, as well as bonds connecting those sentences to correct options[2]. To exemplify, consider the following reading comprehension question taken from the corpus in this thesis:

> **Factual Information question**
> According to paragraph 2, what evidence indicates that aggression in animals is related to the hypothalamus?
> a. Some aggressive animal species have a highly developed hypothalamus.
> b. Artificial stimulation of the hypothalamus results in aggression in animals.
> c. Animals behaving aggressively show increased activity in the hypothalamus.
> d. Animals who lack a hypothalamus display few aggressive tendencies. (ETS, 2006a: 70)

This is an example of a factual information question type, discussed in Chapter 3, above, which requires test-takers to "*understand some of the details contained in the passage*." (ETS, 2002: 56) Each of the options can be joined to the question to form a statement the validity of which can be assessed by means of the identification of a considerable number of links which bond with one or more sentences in the excerpt indicated in the question, namely Paragraph 2. Paragraph 2 is formed by Sentences 3 to 8. The statement formed by the correct option, Option *b,* bonds with one of the

[2] In Batista (2002), MacMillan (2006), as well as in the present study, a minimum of three points of reference has been used as the criterion for the identification of bonds between test items and specific sentences in the passages in question.

sentences in this excerpt, Sentence 8, by means of as many as eight links, as demonstrated below:

> **[b]** The evidence indicating that aggression in animals is ***related to***[1] the ***hypothalamus***[2] is that ***artificial***[3] ***stimulation***[4] of the ***hypothalamus***[5] ***results in***[6] ***aggression***[7] in ***animals***[8].
>
> **[7]** The ***hypothalamus***[2] appears to be ***involved in***[1] this inborn reaction pattern: ***electrical***[3] ***stimulation***[4] of part of the ***hypothalamus***[5] ***triggers***[6] stereotypical ***aggressive***[7] behaviors in many ***animals***[8].

A similar application of Hoey's (1991) model has been used to address the first two of the three research questions motivating this study: "Is it possible to identify cohesive patterns relative to specific test items connecting questions to relevant sentences in the passage?" and, if so, "Do these cohesive patterns hold across different versions of the test, which might employ different question types to assess given reading skills?"

Based on the impressions stemming from a pilot study conducted by the present researcher (MacMillan, 2006) involving the analysis of 6 Paper-based TOEFL® Reading Practice tests (totaling 300 questions) using Hoey's (1991) analytical system, it was felt that future analyses may benefit from a certain number of changes. The first was the adoption of one of the labels suggested by Károly (1999), *synonymy*, in what she termed a "refined taxonomy" based on Hoey's (1991) original model. In harmony with this change, the adoption of the concept of Karoly's *opposites* category was also felt to be appropriate. However this has been placed under the alternate labels *simple* and *complex antonymy*[3]. A final change, which was believed to potentially enhance the categories of analysis in the present study, was the replacement of Hoey's

[3] This change was based on a suggestion made by Michael Hoey, in a personal online communication regarding this chapter (October 17, 2006).

(op.cit) deixis with a new category, *labeling*, based on Francis' (1994) notion of *retrospective labels*.

Károly's (1999) label *simple synonymy* has been used in place of Hoey's (1991) simple paraphrase. In her taxonomy, Károly (op.cit) uses the label *derived synonymy* to designate synonyms which do not belong to the same word class, certain of which might be identified by Hoey's (op.cit) link-triangle complex paraphrase. This, however, was considered to be a misleading label since this category fails to involve a derivation process, i.e. the addition of affixes to a morpheme. Therefore, for the sake of clarity, the label *complex synonymy* has been preferred in this thesis. The new category *complex synonymy* has the added benefit of picking up instances of repetition which a strict application of Hoey's (op.cit.) original model would disregard when these did not form a link triangle (See Section 4.2.2, above).

Károly's (1999) opposites category refers to instances of cohesion which would be in part covered by Hoey's (1991) complex antonymous paraphrase. She terms *simple opposites* those items that are opposite in meaning and belong to the same word class. Note that under this category Károly (op.cit) includes antonyms sharing a morpheme (e.g., *happy – unhappy*), which, as discussed in Section 4.2.2 above, would be categorized as complex repetition in Hoey's (op.cit) original taxonomy. Under *derived opposites* Károly (op.cit) includes items that are opposite in meaning and belong to different word classes. The manner in which both simple and derived opposite categories operate was considered to make the instances of cohesion they refer to more self-evident. Nevertheless, for the sake of harmony, the labels *simple* and *complex antonymy*, respectively, have been

preferred. Note that, following Jones (2002: 1), the term *antonymy* is here used in "*its broader sense, referring to any pair of words which could intuitively be recognized as 'opposites'*." Therefore, in this study, the antonymy category includes not only gradable pairs, such as *cold/hot*, but also non-gradable pairs, such as *dead/alive,* the latter being a category which certain linguists, including Lyons (1977) and Cruse (1986) have termed *opposites*.

Finally, a parallel has been drawn between deixis in Hoey's (1991) model and Francis' (1994: 83) notion of *labelling*, in which a nominal phrase "*requires lexical realization, or lexicalization, in its co-text*." Francis (op.cit: 85) uses the term *retrospective label* to refer to a nominal group which encapsulates a stretch of discourse and indicates to the reader how it should be interpreted. She points out that retrospective labels are more often than not formed by deictics, such as *this, that* or *such*, followed by a head noun, which is unspecific in nature, such as Halliday and Hasan's *general nouns* (1976: 27). Francis (1994: 89) adds that a large number of retrospective label head nouns are "***metalinguistic*** *in the sense that they label a stretch of discourse as being a particular type of language*." (original emphasis) The following is an example, taken from one of the passages in this corpus, of a co-reference link formed by a retrospective label with a metalinguistic head noun. Sentences are numbered for ease of reference.

> **[16]** Because some paintings were made directly over others, obliterating them, it is probable that a painting's value ended with the migration it pictured.
>
> **[17]** Unfortunately, **this explanation** fails to explain the hidden locations, unless the migrations were celebrated with secret ceremonies. (ETS, 2005a: 154)

Note that, in Hoey's (1991) original taxonomy, the demonstrative adjective *this* in the example above would be classified as an instance of deixis (See Section 4.2.2, above). However, the head noun *explanation* would be disregarded for accounting purposes, and the repetition treated as "*affecting only the most recent sentence*." (Hoey, 1991: 270, note to page 72) It was felt that this position, although still acknowledging the bond formed between the two sentences in the example, ignores the fact that the label *this explanation* is a unit; it is a lexical item capable of entering into repetition relations of its own right, all of which should be accounted for. Moreover, the only items Hoey (op.cit) directly mentions as forming deictic repetition links are demonstrative adjectives (he uses the term *demonstrative modifiers*). Although briefly mentioned in Hoey's (op.cit: 74) discussion of substitution links, there is no clear indication that the modifiers *(an)other, the other, (the) same, different,* and *similar* may also be present in deictic repetition links. This is also true of *next* and *further,* as well as numeratives, such as *second* and *third*, which are altogether ignored in Hoey's (op.cit) model. For these reasons, and for the sake of clarity, Hoey's (op.cit) deixis has been replaced in this study with a new category, *labeling*, which reflects Francis' (1994) description of retrospective labels.

All remaining labels and definitions in Hoey's (1991) taxonomy have been kept in their original form. Table 8 provides a representation of the resulting revised taxonomy.

Table 8 Revised Repetition Model

TYPES OF REPETITION	
Lexical Relations	
Lexical Repetition	• Simple
	• Complex
Synonymy	• Simple
	• Complex
Antonymy	• Simple
	• Complex
Superordinate Repetition	
Hyponymic Repetition	
Co-Reference	
Labeling	
Non-lexical Relations	
Substitution	• By pro-forms
	• By Æ (Ellipsis)

The last research question motivating this study considers the possibility of there being a connection between cohesive patterns bonding test items with relevant sentences in passages and item difficulty. The first step in addressing this question was to determine the level of difficulty of the 608 test items in this corpus. The framework and additive scoring rubric for the analysis of prose reading tasks in Jamieson et al. (2000) has been used for this purpose. The following section will describe this analytical system and the manner in which it has been applied to the purposes of this research.

4.4 The analysis of Reading Test Item Difficulty

Jamieson et al. (2000), in discussing reading/literacy research that has attempted to quantify relationships between test items and text features, mention that these may be described in terms of three variables: *type of information requested, type of match,* and *plausibility of distractors.* Of these variables, *type of match* has been considered to be that most closely related to the purposes of this research because it concerns the processes used by examinees to relate information in the test item to the necessary information in the passage; it also relates to those processes needed to identify the correct answer from the information available. Therefore, it was decided that the analysis of item difficulty in this study should isolate and focus on this variable alone.

According to Jamieson at al. (2000: 21, 22) the scoring of type of match in prose processing tasks involves the assessment of five items: 1) *strategy type*, 2) *number of phrases in question to search on*, 3) *number of items in response*, 4) *type of match for given information* (question), 5) *requirements to identify requested information* (relevant points in passage / correct options).

The first of these items, strategy type, consists of a range of four strategies, here presented on a rising scale of difficulty. These strategies are: *locating, cycling, integrating,* and *generating*. Locating tasks require test-takers to match one or more pieces of information within the test item to either identical or synonymous information in the passage in question. Cycling tasks require that respondents engage in a series of locating actions in order to

satisfy the conditions entailed in the test item. Integrating tasks involve the use of one or more cycling strategies to identify pieces of information within the passage, followed by the relation of the different pieces of information according to requirements in the question. Some of the relations examinees may be expected to identify between pieces of information in the passage include: similarity (i.e., comparison), difference (i.e., contrast), degree (e.g., size, intensity), cause – effect, problem – solution, hypothesis – evidence, information saliency (e.g., distinguishing more important from less important information), and assertion – reason. Finally, generating tasks require that test takers use an integrating strategy to relate pieces of information based on categories or connections they have inferred from the passage.

The second item to be scored is the number of phrases in question to search on. Jamieson et al. (2000: 69) argue that this item "*acknowledges that, as the amount of text-related information specified in a question increases, question difficulty is also increased*." A question consisting of only one phrase or sentence, for instance, would be considered to be easier than a question containing multiple sentences. It should be noted, however, that this scoring item does not include information which is intended specifically to guide examinees as to how to respond to a question, such as the following directive common to all Fill in a Table (ETS, 2005a, 2006a) items discussed in Chapter 3, above:

> Complete the table by matching the phrases below
> **Directions:** Select the appropriate phrases from the answer choices and match them to the type of organism to which they relate. TWO of the answer choices will NOT be used. ***This question is worth* 4 *points.***
>
> Drag your answer choices to the spaces where they belong. To remove an answer choice, click on it. To review the passage, click on **View Text**.

The sentences in this directive would all be disregarded for scoring purposes.

The third item to be scored for the type of match variable in prose processing tasks is the number of items in response. Matching difficulty in this case is directly proportional to the number of responses required to successfully complete the task. Difficulty increases in cases in which the number of responses is not specified in the question.

The fourth item to be scored regards the type of match for given information, or the process required to match the information in the stem of the test item to relevant portions in the passage in question. This item involves a range of three types of match, which, in order of difficulty, are: a) literal or synonymous match; b) match requiring low-level, text-based inference (e.g., identification of a condition or referent); and c) match requiring high-level, text-based inference (i.e., deduction stemming from information implied but not directly stated in the passage).

Finally, the fifth item scored for the type of match variable, requirements to identify requested information, concerns the processes involved in the identification of points in the passage yielding the correct answer to the question. In the case of fixed-response questions, it specifically concerns the processes involved in matching relevant points in the passage to correct options. Four requirements are taken into account in this item. On a rising scale of difficulty, these requirements are: a) identification of a paradigmatic relation; b) low-level text-based inference; c) some prior knowledge or identification of a syntagmatic relation; and d) high-level text-based inference. The first of these requirements is considered to be relatively easy because it involves no inference. In such cases, the required information

is often synonymous with given information in the question and occurs within a paradigmatic context in the passage, i.e., synonyms appear as the same part of speech, in the same syntactic relation, and in the context of one or more identical words as the words or phrases they are repeating. The second requirement, somewhat more difficult than the first, entails the use of a low-level, text-based inference, which often involves the identification of a condition or the matching of a referent with its pro-form. The third requirement, more difficult than the previous two, calls for respondents to "*bring specialized knowledge in order to recognize text information as belonging to a particular category of information*." (Jamieson et al., 2000: 71) At the same level of difficulty, required information may also consist of a paraphrase of given information within a syntagmatic context, where synonyms do not share the same part of speech or syntactic relation, and where the immediate context contains very few or no exact lexical repetitions. Finally, the fourth and most difficult requirement presupposes the use of high-level, text-based inference. Here, the required information is not explicitly stated, but has to be retrieved by association with related information in the passage. Table 9 shows the additive scoring rubric for the evaluation of the level of difficulty of reading tasks in terms of the type of match variable based on Jamieson et al. (2000: 70).

Table 9 Additive Scoring Rubric for *Type of Match* in Reading Tasks

Task Feature 1	**Strategy type**			
	Locate	+1		
	Cycle	+2	Within one paragraph	+0
			Between paragraphs	+1
	Integrate	+3	Compare (similarity)	+0
			Contrast	+1
	Generate	+5		
Task Feature 2	**Number of phrases to search on**			
	1 phrase	+0		
	2 phrases	+1		
	3 phrases	+2		
	4 phrases	+3		
Task Feature 3	**Number of items in response**			
	1 item	+0	For multiple responses:	
	2 items	+1	If number is specified	+0
	3-4 items	+2	If number is not specified	+1
	5+ items	+3		
Task Feature 4	**Type of mach for given information**			
	Literal or synonymous match			+0
	Match requires low-level text-based inference			+1
	Match requires high-level text-based inference			+2
Task Feature 5	**Requirements to identify requested information**			
	No inference or identification of paradigmatic relation			+0
	Low-level text-based inference			+2
	Identification of condition or antecedent			
	Some prior knowledge			
	Identification of syntagmatic relation			+3
	High-level text-based inference			+4

The following chapter will report on and discuss the results of the analysis of the corpus in this thesis using the analytical frameworks described in this chapter.

Chapter 5

Patterns of Lexis in the Reading Comprehension Section of the TOEFL® Test

5.1 Overview

The aim of this chapter is to report on the results of the analysis of the corpus in the present thesis, which was intended to answer the following three research questions:

a) Is it possible to identify cohesive patterns relative to specific test items in the TOEFL connecting questions to relevant sentences in the passage?

If so,

b) Do these cohesive patterns hold across different versions of the test, which might employ different question types to assess given reading skills?

And, finally,

c) Is it possible to observe any correlation between cohesive patterns and item difficulty?

This chapter will thus identify the most frequent lexical links found relative to each of the question types in this corpus and, whenever possible, provide indications of the existence of patterns. Subsequently, a correlation will be made between any patterns found and the level of difficulty of the questions involved.

5.2 The Identification of Dominant Links

It has been mentioned (Section 4.3, above) that research questions *a* and *b*, above, would be addressed by means of the lexical cohesive analysis of the TOEFL® practice reading comprehension tests in this corpus. Even though this analysis involved the identification of instances of lexical repetition, which, in the majority of cases, are self-evident or easily verifiable through context and/or thesauri, certain lexical links found in this corpus may be said to constitute potentially borderline or arguable cases, given their particularly intuitive nature. Therefore, for validity purposes, a second analyst, who also acted as this researcher's co-advisor, was invited to verify these special cases, and identify additional cases (arguable or otherwise), which might have been overlooked in the first analysis. Cases which have been established as doubtful after this second analysis have been disregarded for accounting purposes.

The results of the lexical cohesive analysis of the TOEFL® practice reading comprehension tests in this corpus suggest that patterns in the form of *dominant lexical links* may be observed connecting question stems, relevant points in the passages in question, and correct options in specific fixed-response test items, which entails a positive answer to the first two research questions motivating this study.

Initially, it would seem useful to define what is meant in this study by *dominant lexical links*. It has been mentioned in Section 4.3, above, that the research results in Batista (2002) suggested that it is possible to observe bonds between fixed-response reading comprehension test items and

relevant sentences in the passages in question, a result which was replicated in the pilot study conducted by the present researcher involving 300 TOEFL® PBT practice reading comprehension questions (MacMillan, 2006). These bonds, as described by Hoey (1991), are formed by multiple lexical links, which, more often than not, are of different kinds. Two basic criteria were used in this study to distinguish which link(s) could be considered dominant, or carrying the most weight in the establishment of each bond. For the sake of simplicity, the distinction between simple and complex variants of the same link category (e.g., Simple Repetition, Complex Repetition) has been ignored in the identification of dominant links. In other words, dominant links have been represented in their general categories (e.g., Repetition).

The first criterion used in the identification of dominant links was frequency. According to this criterion, the type(s) of link(s) representing the largest portion of the bond in question may be considered the dominant link(s), as in the following example:

> Which of the following would be most effective in **reducing**[1] **reverberation**[2] in a room?
>
> **c. Covering**[3] the **walls**[4] with **soft**[5] **material**[6]
>
> **[15] Reverberation**[2] can be **reduced**[1] by **draping**[3] the **walls**[4], using a **soft**[5], pulpy **material**[6] for the ceiling, or even by the presence of an audience in winter clothing. (ETS, 2005b)

Here, the correct option, Option *c*, is identified by means of the bond it forms, in combination with the question stem, with Sentence 15 in the passage. Five of the six links forming this bond are Repetition links, the only exception being Link 3 (*covering – draping*), which is a Synonymy link. Therefore, in this case, Repetition has been considered to be the dominant link.

The second criterion, which was taken into consideration in the identification of dominant links, was exclusivity. According to this criterion, dominant links must involve lexical items which are found exclusively in the correct option and not in any distractors. This criterion is of particular importance in cases in which there is not a significant difference in frequency between the different kinds of links forming a bond, as in the following example:

> According to paragraph 1, theories of the **origins[1]** of **theater[2]**
> a. are **mainly[3] hypothetical[4]**.
> b. are well supported by factual evidence.
> c. have rarely been agreed upon by anthropologists.
> d. were expressed in the early stages of theater's development.
>
> **[1]** In seeking to describe the **origins[1]** of **theater[2]**, one must rely **primarily[3]** on **speculation[4]**, since there is little concrete evidence on which to draw. (ETS, 2006b)

In this example, the bond between the correct option (Option *a*) and the passage (Sentence 1) is marked by four links: two Repetition links (*origins – origins*, *theater – theater*), and two Synonymy links (*mainly – primarily*, *hypothetical – speculation*). Because two of the lexical items forming the Repetition links are present in the stem of the test item (*origins, theater*), they may be said to be common to all options, including the distractors. Therefore, even though Synonymy links cannot be said to be more frequent in this case, Synonymy has still been considered to be the dominant type of link given that it involves pairs including lexical items which are present exclusively in the correct option (*mainly, hypothetical*).

In certain cases, the second criterion is met by a combination of two different types of links. In such cases, both types of links were admitted as complementary dominant links. The following test item is an example:

The phrase "**This possibility[1]**" in line 27 refers to the **likelihood[1a]** that the
a. solar constant has declined
b. Nimbus 7 satellite is older than solar max
c. solar constant cannot be measured
d. instruments[1b] are **providing inaccurate data[1c]**

[15] Although solar Max's data have indicated a slow and steady decline in the Sun's output, some scientists have thought **{**that the **[satellite's aging detectors[1b]] [might have[1a]]** become less sensitive over the years, thus **[falsely indicating a drop in the solar constant[1c]]}** **[1].**

[16] **This possibility[1]** was dismissed, however, by comparing Solar Max's observations with data from a similar instrument operating on NASA's Nimbus 7 weather satellite since 1978. (ETS, 1998b: 75)

Here, the nominal phrase in question (*this possibility*), in Sentence 16 in the passage, forms a Labeling link with its lexicalization, a clause within Sentence 15. The lexicalized form of *this possibility*, in turn, bonds with the correct option (Option *d*) by means of three embedded Synonymy links. Therefore, Labeling and Synonymy were considered complementary dominant links in this case.

Certain question types in this corpus involve the identification of several bonds between the test item and the passage. This is the case of Prose Summary, Fill in a Table, and Negative Factual Information questions. The first two of these question types have multiple correct options, each of which forming an individual bond with the passage. The last of these question types, however, involves the identification of the one option that is untrue according to the passage. For this reason, bonds may be observed connecting each of the three distractors, rather than the correct option, with the passage. In all of these cases, an attempt was made, whenever possible,

to select the most frequent dominant links to represent the test items as a whole.

Finally, in a large number of cases, the connection between the correct option and the passage is marked by a single lexical link, rather than a bond involving several different links. In such cases, the individual links were regarded as dominant in spite of the absence of supporting links. This proved to be the case in all Vocabulary questions, as well as in 89.8% of the Reference questions in this corpus. The following is an example of a Vocabulary question:

> Look at the word rare in the passage. Click on the word in the bold text that has the same meaning.
>
> **The Southwest has always been a dry country, where water is scarce, but the Hopi and Zuni were able to bring water from streams to their fields and gardens through irrigation ditches. Because it was so rare, yet so important, water played a major role in their religion. They developed elaborate ceremonies and religious rituals to bring rain.** (ETS, 2000)

In this example, the word in question, *rare*, forms a Synonymy link with the correct answer, *scarce*, the only other adjective in the highlighted excerpt modifying the noun *water*. Synonymy was thus considered the dominant link in this case.

Table 9 provides the most frequent dominant links found relative to the question types and test versions in this corpus. It should be noted that this table fails to include four question types in the corpus, namely Sentence Relation, Organizational Structure, Prediction, and Tone questions. The decision to omit these question types has been made based on their extremely low frequency. When combined, these items accounted for only 0.8% of the total number of questions in the corpus. For this reason, any

results associated with these items could not be considered to be representative of a pattern and were thus disregarded in the analytical process.

Table 10: Frequent Dominant Links

QUESTION TYPES	DOMINANT LINKS					
	PBT		CBT		iBT	
Main Idea	Repetition	43.7%	Synonymy	87.5%	---	
Factual Information	Synonymy	54.1%	Synonymy	50%	Synonymy	68%
Inference	Synonymy	50%	Synonymy Repetition	41.6% 41.6%	Synonymy	64.2%
Vocabulary	Synonymy	100%	Synonymy	98.6%	Synonymy	100%
Reference	Substitution	88.4%	Substitution	85%	Substitution	92.3%
Rhetorical Purpose	Synonymy	62.5%	Synonymy	57.1%	Synonymy	53%
Neg. Factual Info.	Repetition	64.7%	Synonymy Repetition	41.6% 41.6%	Repetition	55.5%
Locate Information	Synonymy Repetition	33.3% 33.3%	Synonymy	80%	---	
Insert Text	---		Labeling Substitution	33.3% 33.3%	Labeling	40%
Sent. Simplification	---		---		Synonymy	85.7%
Prose Summary	---		---		Synonymy	50%
Fill in a Table	---		---		Synonymy	80%

5.3 The Correlation of Lexical Patterns and Item Difficulty

It has been argued in Section 5.2, above, that the results of the lexical cohesive analysis of the tests in this corpus suggests an affirmative answer to research questions *a* and *b* (Section 5.1, above). It may be inferred from these results that: a) it is possible to identify cohesive patterns relative to specific test items in the TOEFL® Reading Comprehension Section connecting questions to relevant sentences in the passage, and b) these cohesive patterns hold across different versions of the test in which specific reading skills are assessed by means of different question types.

The present section, as well as the following, below, are concerned

with the last research question motivating this study (Section 5.1, above), which involves the possible correlation between the dominant link(s) related to the questions in this corpus and the level of difficulty of the same test items. As a first step in addressing this question, the framework and additive scoring rubric described in Jamieson et al. (2000), and discussed in detail in Section 4.4, above, has been used to assess the level of difficulty of each of the test items in this corpus in terms of the type of match variable. Section 5.3.1 will discuss the results this portion of the analysis. This will be followed, in Section 5.3.2, by a correlation of those results and the lexical patterns associated with the same test items (Section 5.2, above).

5.3.1 Assessing the Level of Difficulty of Test Items

It has been argued in Section 4.4, above, that the assessment of the level of difficulty of reading comprehension test items in terms of the 'type of match variable' (Jamieson et al., 2000) involves the scoring of five task features, namely 1) *strategy type*, 2) *number of phrases in question to search on*, 3) *number of items in response*, 4) *type of match for given information*, and 5) *requirements to identify requested information*. The results found for the different question types in this corpus in terms of each of these features will be discussed in turn.

5.3.1.1 Individual Scores for Task Features

5.3.1.1.1 Task Feature 1: Strategy Type

According to the strategy type feature, reading test items may be categorized as 1) *locating tasks*, 2) *cycling tasks*, 3) *integrating tasks*, and 4)

generating tasks, scored 1, 2, 3, and 5, respectively.

Each of the question types considered in this analysis has been associated with a single strategy type. All of the examples of Vocabulary, Reference, Locate Information, Factual Information, and Sentence Simplification questions in this corpus may be said to fall under the locate task category. According to Jamieson et al. (2000), this is the simplest of the strategy types, thus receiving the lowest difficulty score (1), given that it requires examinees to match a piece of information within the test item to either identical or synonymous information in the passage in question. This strategy may be associated with the identification of Repetition and Synonymy links connecting the question stem and correct option with relevant points in the passage. As previously mentioned in Section 5.2, above, in all Vocabulary and in most Reference questions, the identification of a single link is involved in determining the correct option. In Locate Information and Factual Information questions, on the other hand, the question stem bonds with the sentence in the passage representing or yielding the correct option, often by means of a number of Synonymy and/or Repetition links. The following Locate Information question is an example:

> Where in the passage does the author discuss the **separation**[1] of the **stage**[2] and the **audience**[3]?
>
> **b.** Lines 12-14
>
> **[9]** Furthermore, a suitable site had to be provided for performances, and when the entire community did not participate, a clear **division**[1] was made between the **"acting area"** [2] and the **"auditorium."** [3] (ETS, 1998b: 87)

Here, Sentence 9 bonds with the question stem by means of two Simple Synonymy links (*separation – division*, *stage – acting area*) and one Complex

Repetition link (*audience* – *auditorium*). The correct option, *b*, indicates the location of Sentence 9 within the printed text. Finally, in Sentence Simplification questions, as discussed in Section 3.3.2, above, a fixed directive, rather than a question stem, initiates the test item. Thus, in these questions, a bond such as that exemplified above, may be observed between the correct option and the highlighted sentence in the passage, rather than the fixed directive, which is ignored for analytical purposes.

Cycling, the second task category within strategy type, has been associated with all of the examples of Negative Factual Information and Main Idea questions in the corpus of this study. This task category is considered more complex than locating tasks because it requires that test-takers engage in a series of locating actions in order to satisfy the conditions entailed in the test item. Due to the fact that in Negative Factual Information questions the correct option is untrue according to the passage, respondents may often have to perform several locating actions to identify the one option which does not match with any portions of the passage. In the case of Main Idea questions, a number of locating actions are required to identify *central sentences* (Section 4.2, above) in the passage and their main focus. Cycling tasks in which the relevant information was concentrated within a single paragraph have been scored 2, whereas ones in which information was spread across different paragraphs in the passage have been scored 3.

The third task category, integrating, has been related with three questions types in the corpus, namely Inference, Rhetorical Purpose, and Insert Text questions. Integrating tasks involve the use of one or more cycling strategies to identify pieces of information within the passage. Test items

reflecting this strategy type require that examinees understand how these pieces of information relate and complement one another. Examinees are expected to demonstrate this understanding by inferring how pieces of information are related, as in Inference questions, by identifying the type of relation being held, as in Rhetorical Purpose questions, or by determining where a given piece of information would best fit in the passage, as in Insert Text questions. In tasks in which the type of relation being held between the pieces of information in question was one of similarity, a 3-point score has been assigned for strategy type. However, in cases in which the type of relation in question was that of contrast, a 4-point score has been assigned.

Finally, generating tasks have been associated with two of the question types in the corpus, namely Prose Summary and Fill in a Table questions. Tasks of this type, representing the highest score for difficulty (5), require that test takers use an integrate strategy to relate pieces of information based on categories or connections inferred from the passage. Consider the following Fill in a Table question:

> **Directions:** Complete the table below by matching five of the six answer choices with the approach to aggression that they exemplify. ***This question is worth 3 points.***
>
> | Approach to Understanding Aggression | Associated Claims |
> |---|---|
> | Biological Approach | ➤ _____ |
> | Psychodynamic Approach | ➤ _____
➤ _____ |
> | Cognitive Approach | ➤ _____
➤ _____ |
>
> (ETS, 2006a: 74)

Here, a generating strategy is required to identify, among the options given, the statements which relate with the categories inferred from the passage forming the left column.

Test items involving integrating or generating strategies entail the use of some level of inference, which is reflected in task features 4 and 5, discussed in Sections 5.3.1.1.4 and 5.3.1.1.5, below. The following two subsections, however, are concerned with task features 2 and 3, which regard the influence of the amount of information involved in reading questions and expected responses on the level of difficulty of those test items.

5.3.1.1.2 Task Feature 2: Number of Phrases in Question to Search On

In this study, this task feature has been scored according to the number of phrases in the question stem. This included specific portions of the related passage which are mentioned in the question stem. Consider the following Locate Information question in the corpus:

> Click on the sentence in paragraph 1 that explains why the Hopi and Zuni Indians of North America chose the kinds of locations they did for building their homes. (ETS, 2002b)

Here, the whole of Paragraph 1 in the passage in question has been considered to add up to the number of phrases to search on in this test item.

It should be noted that what is meant here by *phrase* includes both incomplete and full sentences. According to the additive scoring rubric in Jamieson et al. (2000) for the assessment of the level of difficulty of reading comprehension test items in terms of the type of match variable, question stems involving only one phrase are scored 0, those involving two phrases are scored 1, those involving three phrases are scored 2, and those involving

four phrases or more are scored 3.

All examples of a number of question types in the corpus have yielded a single score for this task feature. Reference questions have been scored 1; Negative Factual Information questions have been scored 2; and Main Idea, Insert Text, Sentence Simplification, Prose Summary, and Fill in a Table questions have all been scored 3. All remaining question types considered in the analysis have demonstrated a certain level of variance in terms of the number of phrases in question to search on. This suggests that, in the case of these last five question types, this task feature plays a role in determining the level of difficulty of individual test items. The score for this feature ranges from 0 to 1 in Factual Information questions, from 0 to 3 in Vocabulary questions, and from 1 to 3 in Inference, Rhetorical Purpose and Locate Information questions. Note that, according to the scoring rubric, 1 point should be added to the score if the number of responses is not mentioned in the test item. However, this did not prove to be the case in any of the questions in the corpus.

5.3.1.1.3 Task Feature 3: Number of Items in Response

In this study, this task feature has been scored according to the number of correct options in each test item. The vast majority of the test items in the corpus involve the identification of a single correct option, which corresponds to a 0 score. The only exceptions are the new question types introduced within the Reading to Learn (Section 3.3.2, above) category in the TOEFL® iBT, namely Prose Summary and Fill in a Table questions. The former questions involve three correct options, thus scored 2 for difficulty, and

the latter involve five to seven correct options, thus scored 3.

5.3.1.1.4 Task Feature 4: Type of Match for Given Information

This task feature regards the process required to match given information, or information in the stem of the test item, to relevant portions in the passage in question. Three levels of difficulty may be assigned to a reading question in terms of this feature. The simplest level, scored 0, involves a literal or synonymous match between question stem and passage; the medium-difficulty level, scored 1, requires the use of low-level, text-based inference; and the most difficult level, scored 2, requires high-level, text based inference. The results of the analysis suggest that this task feature plays a role in determining the overall level of difficulty of individual test items within the majority of the question types taken into account in this study.

As discussed previously, in Section 5.3.1.1.1, above, a literal or synonymous match between question stem and passage often involves the identification of Repetition or Synonymy links. In addition, results drawn from the questions in this corpus indicate that in certain cases, this type of match may also involve Superordinate or Hyponymic Repetition links[1], as in the following example:

> According to the passage, in what way do *[sand dunes]*[1] *interfere*[2] with **transportation**[3]?
>
> **[4]** In this manner, *[sand dunes]*[1] engulf everything in their path, including structures made by people, and *[pose a major problem]*[2] in the construction and maintenance of **[highways and railroads]**[3] that cross sandy areas of desert. (ETS, 2000)

In this test item, the question stem bonds with the sentence in the passage yielding the correct option by means of three links, one of which is the

[1] In this study, in cases in which a Superordinate or a Hyponymic Repetition link was observed between a test item and a sentence in the related passage, the lexical item within the question has been considered to be the earlier element forming the link.

Hyponymic Repetition of *transportation* in the question by means of the more specific terms *highways and railroads* in the passage. The bond is completed by an additional Simple Repetition link (*sand dunes – sand dunes*), as well as a Synonymy link (*interfere – pose a major problem*).

All examples of six question types in the corpus have been assigned a 0 score for type of match for given information. These question types are: Vocabulary, Reference, Locate information, Rhetorical Purpose, Sentence Simplification, and Insert Text questions. In the case of the first five, the given information involves lexical items or sentences which have been lifted from the passage and thus represent a literal match. In the case of the Insert Text question type, because the given information considered for accounting purposes consists of a sentence which is supposed to be added to the passage, it was decided that this should also be interpreted as representing a literal match.

The second level of difficulty regarding the type of match for given information, scored 1, requires the use of low-level, text-based inference, which may involve the identification of a condition or of the referent of a pro-form. The test items in this corpus which have been scored 1 for this feature are examples of more complex Factual Information, Prose Summary, and Fill in a Table questions. In these question types, this type of match was marked by Substitution (including Ellipsis), Labeling, and/or Co-reference links. The following Factual Information question illustrates this point:

> How would **[wood pigeons]**[1] most likely *react*[2] if a **[member of the flock]** [3] *[failed to make]*[4] *[intention movements]*[5]?
>
> **[11]** But if one Æ**<member of the flock of wood pigeons>**[3] spots danger and does an emergency take off, the others interpret the *absence*[4] of *[intention movements]*[5] as an alarm signal, and the whole flock Æ**<of wood pigeons>**[1] *[rises into the air]*[2]. (ETS, 2000)

In this example, the question stem bonds with Sentence 11 in the passage by means of five links, two of which are Ellipsis links. The remaining links forming the bond include one Simple Repetition of *intention movements*, and two Complex Synonymy links between *failed to make*, in the question stem, and *absence of*, in the passage, and between *react* in the stem and *rises into the air*, in Sentence 11.

Finally, the most complex type of match for given information, scored 2, requires the use of high-level, text-based inference, which involves a deduction stemming from information implied but not directly stated in the passage. All test items in the corpus receiving this score are examples of more complex Inference questions. In the majority of these items, this type of match was marked by Repetition and Synonymy links between given information and sentences in the passage yielding target meanings. The following is an example:

> Which of the following can be inferred from paragraph 5 about **variations**[1] in *political*[2] *beliefs*[3] within the *Whig*[4] party?
>
> **[26] [In particular**, *Whigs*[4] **in the northern sections of the United States]**[1] also *believed*[3] that *government*[2] power should be used to foster the moral welfare of the country. (ETS, 2006a: 105)

In this test item, the statement within the question stem, which should serve as the basis for the requested inference, is not directly stated in the passage. However, a connection, which may be said to correspond to a Complex Synonymy link, may be inferred between the phrase *"in particular, Whigs in the northern sections of the United States*," in Sentence 26, and the term *variations* in the question stem. The bond between Sentence 26 and the given information in the test item is completed by means of three additional links:

one Complex Synonymy (*political* – *government*), and two Complex Repetitions (*beliefs* – *believed*; *Whig*(adj.) – *Whigs*(n.)).

5.3.1.1.5 Task Feature 5: Requirements to Identify Requested Information

In this study, this last task feature has been associated with the processes involved in matching relevant points in the passage with correct options. On a rising scale of difficulty, four different requirements to identify requested information have been taken into account: a) the identification of a paradigmatic relation, scored 0; b) the use of low-level text-based inference, scored 2; c) either the use of prior knowledge, or the identification of a syntagmatic relation, scored 3; and d) the use of high-level text-based inference, scored 4.

The majority of the question types considered in this analysis have demonstrated considerable variance in terms of this task feature, with scores ranging from 0 to 3 in Main Idea, Factual Information, Negative factual Information, Sentence Simplification, Prose Summary, and Fill in a Table questions; and from 2 to 4 in Inference and Insert Text questions. Certain question types, however, have yielded the same score for all individual items, namely Vocabulary and Locate Information questions, scored 0; Reference questions, scored 2; and Rhetorical Purpose questions, scored 4.

The simplest of the requirements to identify the correct option involves the identification of a paradigmatic relation. It has been mentioned in Section 4.4, above, that a sentence which paraphrases another by means of this type of relation includes synonyms which appear as the same part of speech, in the same syntactic relation, and in the context of one or more identical words

as the words or phrases they are repeating. All examples of paradigmatic relations in this corpus have been represented by Simple Synonymy links within what may be said to be a "frame" of Simple Repetition links. Consider the following example:

> The Deep Sea Drilling Project was significant because it was
>
> **b.** the *first*[1] **extensive**[2] **exploration**[3] of the *ocean bottom*[4]
>
> **[4]** Although researchers have taken samples of deep-ocean rocks and sediments for over a century, the *first*[1] **[detailed global]**[2] **investigation**[3] of the *ocean bottom*[4] did not actually start until 1968, with the beginning of the National Science Foundation's Deep Sea Drilling Project (DSDP). (ETS, 1998a: 79)

In this item, the Simple Synonymy links (*extensive – detailed global; exploration – investigation*) are surrounded by Simple Repetition links (*first – first; ocean bottom – ocean bottom*), which figure in the same order and are accompanied by the same determiners in both the correct option and in Sentence 4 in the passage in question.

Test items in this corpus requiring low-level, text-based inference to identify the correct option have, more often than not, involved the identification of Substitution, Co-reference, and Labeling links. The following Insert Text question illustrates this point:

> **[4]** These **buildings**[1a] were usually put up against cliffs, both to make construction easier and for defense against enemies.
>
> **[5]** [**They**[1a] were really *villages*[1b] in themselves][1].
>
> **Spanish explorers, arriving much later, must have realized this**[1] **since they called them**[1a] **'pueblos', which is Spanish for *towns*[1b].**
>
> (ETS, 2002b)

Here, the sentence in bold has to be added to the passage. In order to identify the best position for this sentence in the passage, which is following Sentence

5, the examinee is required to make use of a low-level, text-based inference. In this specific case, this level of inference involves the identification of referents, which here are represented by Substitution links between *this* in the sentence to be added and Sentence 5 in the passage in question. Embedded in this link, a second Substitution link may be observed connecting *they* in Sentence 5 and *buildings* in Sentence 4. The recognition of this secondary link allows for the identification of a third bond-forming link, Simple Synonymy, connecting *villages* in Sentence 5 and *towns* in the sentence to be added.

The third requirement to identify the correct option in Jamieson et al's (2000) categorization involves either the use of prior knowledge, or the identification of a syntagmatic relation. No test items in the corpus have clearly demonstrated to require specific background knowledge to be answered successfully, a result which seemed to harmonize with ETS's claim that the subject matter of the passages is general in nature *"so as not to give an advantage to specialists in particular fields of study, or to people with particular kinds of background knowledge."* (ETS, 2002a: 56) However, a considerable number of questions have been found to require the identification of a syntagmatic relation. A sentence which paraphrases another by means of this type of relation includes synonyms which are of different word classes, in diverse syntactic relations, and in a context including few identical words to the items being repeated. Syntagmatic relations between correct options and portions of the relevant passages in the corpus seemed to be marked by the presence of Complex Synonymy links within a "frame" of Complex Repetition links. Consider the bond the correct option of a Sentence Simplification question in the corpus forms with the highlighted sentence in

the related passage (ETS, 2006a: 81):

> **[8]** Apprentices were considered part of the family, and *masters*[1] were *responsible*[2] **[not only]**[3] for *teaching*[4] their *apprentices*[5] a *trade*[6] but also for providing them some education and for supervising their moral behavior.
>
> **b.** The *responsibilities*[2] of the *master*[1] to the *apprentice*[5] **[went beyond]**[3] the *teaching*[4] of a *trade*[6].

In this test item, a Complex Synonymy link between *not only* and *went beyond* is surrounded by two Complex Repetition links (*responsible – responsibilities*; *teaching* (v.) – *teaching* (n.)). The bond between the sentences is complemented by three Simple Repetition links (*masters – master; apprentices – apprentice; trade – trade*).

Finally, test items in the corpus requiring the use of high-level, text-based inference to identify the correct option have often been found to be marked by the presence of Complex Synonymy in a manner similar to that exemplified for Inference questions in Section 5.3.1.1.4, above.

This subsection has reported on the individual scores found for the different question types in this corpus in terms the five task features in Jamieson et al. (2000) for the assessment of the level of difficulty of reading tasks according to the type of match variable. The following subsection will discuss the global scores for type of match found for each of the question types considered in this analysis.

5.3.1.2 Global Scores for the 'Type of Match Variable'

The results of the item difficulty analysis indicate that, in terms of the type of match variable described in Jamieson et al. (2000), the difficulty score of the TOEFL® reading comprehension questions in this corpus ranges from

1 to 15. Table 10 includes a global scale of difficulty for TOEFL® reading comprehension questions based on the scores assigned to the different question types considered in the analysis.

Table 11: Scale of Difficulty for TOEFL® Reading Test Items

Question Types	Level of Difficulty														
	Easy					Medium					Difficult				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Vocabulary	■	■	■	■											
Reference				■											
Locate Information		■	■	■											
Factual Information	■	■	■	■	■	■									
Sent. Simplification				■	■	■									
Neg. Factual Info.					■	■	■	■							
Main Idea						■	■	■	■	■					
Rhetorical Purpose								■	■	■					
Insert Text								■	■	■					
Inference							■	■	■	■	■	■			
Prose Summary										■	■	■	■	■	
Fill in a Table											■	■	■	■	■

The general ranges of difficulty portrayed in Table 10 (easy, medium, and difficult) have been inferred from the global scores, 1 to 15, associated with the different question types. The numbers suggest that there is considerable consistency in terms of the general range of difficulty each of the question types represents.

Individual scores for items representing a number of questions types have been found to figure within a single general range of difficulty. This was the case of Vocabulary, Reference, and Locate Information questions, within the easy range; Main Idea, Rhetorical Purpose, and Insert Text questions, within the medium-difficulty range; and Fill in a Table questions, all within the difficult range.

The remaining question types considered in the analysis have been

found to demonstrate a certain level of variance in terms of general range of difficulty. However, in none of these cases was full-range variance observed, i.e., no question types have included individual items in all three general ranges of difficulty. Variance seemed to be confined to only two adjacent levels of difficulty, namely, with Factual Information and Sentence Simplification questions ranging from easy to lower medium; Negative Factual Information questions ranging from higher easy to medium; Inference questions ranging from medium to lower difficult; and Prose Summary questions ranging from higher medium to difficult.

This subsection has briefly reported on the global scores for type of match found for each of the question types involved in this analysis and the resulting general ranges of difficulty they represent. The following subsection will discuss the extent to which these ranges of difficulty correlate with the lexical patterns, or dominant links, associated with specific question types in the corpus.

5.3.2 Correlating Dominant Links and Range of Difficulty of Question Types

It has been argued in Section 5.2, above, that lexical patterns in the form of dominant links may be associated with the different TOEFL® reading comprehension question types considered in the analysis of this corpus. Section 5.3.1, in turn, has suggested that the same question types seem to represent specific ranges of difficulty according to the type of match variable. The present section will propose that a direct correlation may be observed between these two aspects associated with the question types included in the analysis of this corpus, thus entailing an affirmative answer to the last

research question motivating this study (Section 5.1, above).

A strong connection has been observed between the fifth task feature scored for item difficulty (Section 5.3.1.1.5, above), *requirements to identify the correct option*, and the dominant links associated with the question types in this study. A correlation of the most frequent types of links realizing this feature and the dominant links associated with each of the question types considered in the analysis of this corpus has yielded a very high degree of match. Table 11 provides a representation of this correlation.

Table 12: Correlation of Frequent Links Realizing Task Feature 5 and High Frequency Dominant Links

Question Types	Range of Difficulty	Task Feature 5 links	Dominant links
Vocabulary	Easy	Simple Synonymy	Synonymy
Reference	Easy	Substitution	Substitution
Locate Information	Easy	Simple Synonymy	Synonymy
Factual Information	Easy	Simple Repetition	
	Medium	Simple Synonymy	Synonymy
Sent. Simplification	Easy	Simple Synonymy	Synonymy
	Medium	Complex Synonymy	
Neg. Factual Info.	Easy	Simple Repetition	Repetition
	Medium	Simple Synonymy	
Main Idea	Medium	Simple / Complex Synonymy	Synonymy
Rhetorical Purpose	Medium	Simple / Complex Synonymy	Synonymy
Insert Text	Medium	Substitution Labeling	Substitution Labeling
Inference	Medium	Complex Synonymy	Synonymy
	Difficult		
Prose Summary	Medium	Simple Synonymy	Synonymy
	Difficult		
Fill in a Table	Difficult	Simple Synonymy	Synonymy

The present chapter has reported on the results of the analysis conducted to address the three research questions motivating this study. The following chapter will discuss on the conclusions drawn from these results, including inferences regarding the construct of reading reflected on the Reading Comprehension Section of the TOEFL® test, as well as the

pedagogical implications and limitations involved.

Chapter 6

From Patterns to the Bigger Picture: Conclusions Drawn from Lexical Patterns in the Reading Comprehension Section of the TOEFL® Test

6.1 Overview

It may be said that patterns are both the building blocks and a reflection of the core of organizational structures. A focus on the individual instances of repetition forming patterns may, in turn, provide insights into the nature of the structures formed by these patterns.

In the light of the results of the lexical cohesive analysis of a corpus of 608 fixed-response TOEFL® PBT, CBT, and iBT reading comprehension test items, this thesis has proposed that lexical patterns may be observed connecting question stems and/or correct options to relevant portions of the passages in question. It has been argued that these patterns are, more often than not, realized by specific categories of lexical repetition, or lexical links (Chapter 5, above), according to question type. In other words, it has been suggested that, in reading items in the corpus, the testing of particular reading skills require the identification of specific types of lexical cohesive devices. Equivalent results found for TOEFL ® PBT, CBT, and iBT items seem to indicate that the patterns hold across different versions of the test, even though these may, in certain instances, test the same reading skills by means of different question types.

Based on the results of an additional analysis of the level of difficulty of the same test items, it has been suggested, finally, that the lexical patterns associated with the different question types in the corpus have a bearing on the general range of difficulty of those test items in terms of the 'type of match variable' (Jamieson et al., 2000).

In this concluding chapter, the aforementioned considerations on individual instances of repetition forming the lexical patterns in this corpus will be used as the basis for observations on the nature of the construct of reading reflected on the Reading Comprehension Section of the TOEFL® test. These will be followed by a discussion on the pedagogical implications of the observation of lexical patterns. Finally, a reflection on the limitations of this study and the possible avenues for future research will be included.

6.2 Inferences on the Reading Construct Reflected in the Reading Comprehension Section of the TOEFL® Test

It has been argued in the introductory chapter that the study of reading comprehension tests and the abilities that appear to be being measured by those tests may lead to an improved understanding of what has been assessed (Alderson, 2000: 2). In this section, a focus will be given to the skills tested in the different question types on the TOEFL® test. An appraisal of the distribution of these questions types within each version of the test, along with the ranges of difficulty involved, will also be offered. Finally, based on these considerations, inferences will be made regarding the construct of reading reflected on the TOEFL® Test.

6.2.1 Distribution of Question Types and Ranges of Difficulty in the Test

Chapter 3 introduced the question types present in the Reading Comprehension Section of each of the three editions of the TOEFL® Test: the TOEFL® PBT, the TOEFL® CBT, and the TOEFL® iBT. It has also been mentioned (See Table 7, above) that these editions of the test differ somewhat, both in terms of the categories of questions, as well as in the total number of question types they include. Figures 1 to 5 provide the distribution of the question types focused on in this study in the three editions of the TOEFL® test. Questions have been sorted by the general range of difficulty associated with each of them in Chapter 5 according to the 'type of match variable' (Jamieson et al., 2000).

Figure 6.1 Distribution of Test Items within Easy Range of Difficulty in Different Editions of the TOEFL® Test

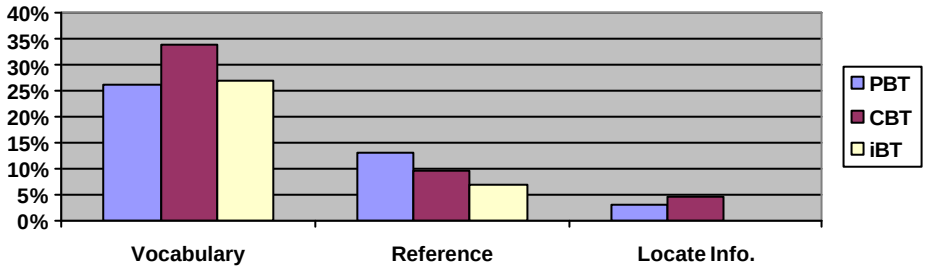


Figure 6.2 Distribution of Test Items within Easy to Medium Range of Difficulty in Different Editions of the TOEFL® Test

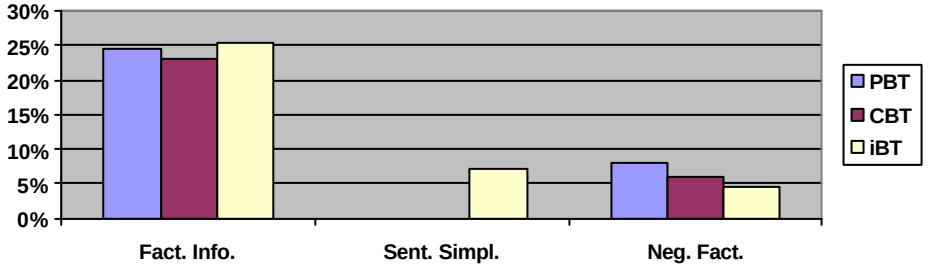


Figure 6.3 Distribution of Test Items within Medium Range of Difficulty in Different Editions of the TOEFL® Test

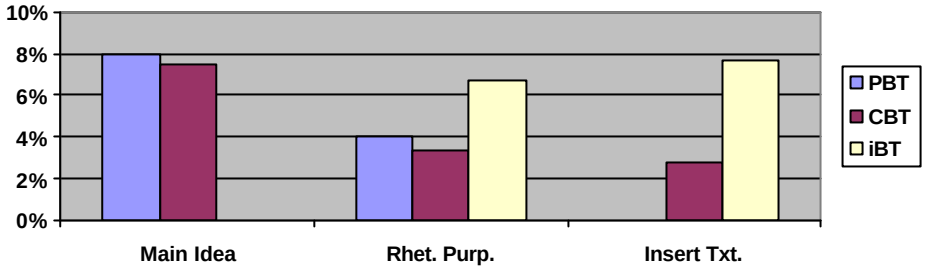


Figure 6.4 Distribution of Test Items within Medium to Difficult Range of Difficulty in Different Editions of the TOEFL® Test

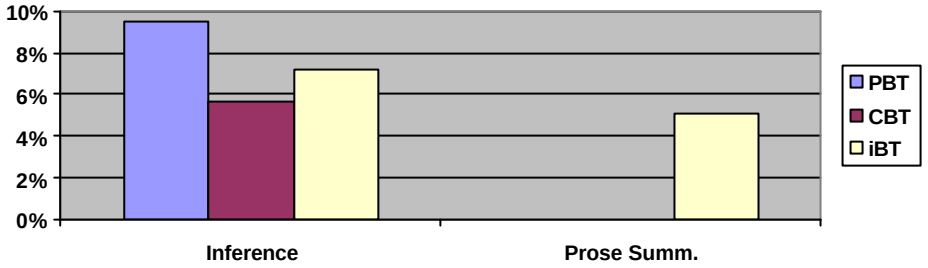
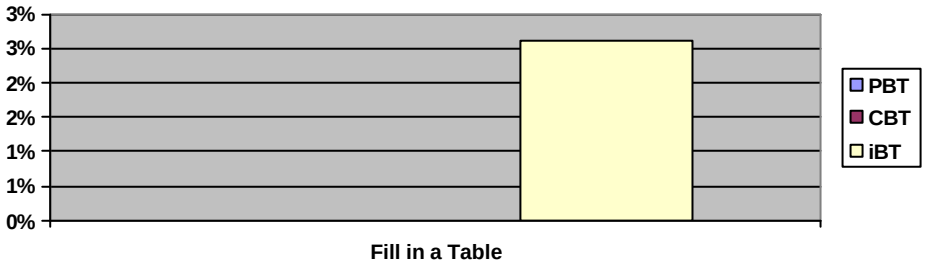


Figure 6.5 Distribution of Test Items within Difficult Range of Difficulty in Different Editions of the TOEFL® Test



The numbers in Figures 1 to 5 correspond to an average of the number of test items representing each of the question types in relation to the total number of questions in each edition of the test.

Certain editions of the test fail to include specific question types. The majority of these different inclusions are arguably limited to the format of the

questions, while the skills tested appear to be maintained across the different versions of the test. Thus, for instance, while Sentence Simplification questions, as described by the ETS (2006a: 28), are only included in the TOEFL® iBT, it may be claimed that the skills these items require are tackled in both the TOEFL® PBT and CBT. This may be observed in Factual Information items such as *"What does the author mean by the statement in lines 6 – 7 that twentieth-century journalism was foreshadowed by the penny press?"* (ETS, 1998b: 32), in which the correct option is a paraphrase, or a simplified version, of the sentence in the passage mentioned in the question stem. This item, in common with most Sentence Simplification questions, has Synonymy as the dominant link. It should be noted that, as previously discussed in Section 5.3.1.1.1, above, both Sentence Simplification and Factual Information questions involve the same strategy type, namely locating.

A similar case may be said to occur with regards to the testing purpose of Insert Text questions. Although this question type is not included in the TOEFL® PBT, the skills it requires are partly involved in this edition of the test within Rhetorical Purpose items such as *"Which of the following types of glaciers does the author use to illustrate the two basic types of glaciers mentioned in line 1?"* (ETS, 1998a: 37) Here, the examinee is required to identify among the options given that which includes portions in the passage forming a relation with the sentence mentioned in the question stem (Sentence 1). Here, again, Insert Text questions and Rhetorical Purpose questions involve the same strategy type, namely integrating.

A final example in this regard is the Main Idea question type, which, although not present in the TOEFL® iBT, requires skills which may be said to be included in the more complex Prose Summary questions in this edition of the test. In Main Idea questions, the correct option may be identified by means of the identification of central sentences marked by multiple Repetition links across the passage. In contrast, in Prose Summary questions, the main idea of the passage is given as the title of the summary, and the three correct options paraphrase selected 'central sentences' in the same passage. (Hoey, 1991: 43)

It would seem that several of the skills required to successfully answer Prose Summary, as well as Fill in a Table questions, both present only in the TOEFL® iBT, are not tested in the other versions of the test. These question types, forming the Reading to Learn category of questions introduced in the TOEFL® iBT, involve skills such as understanding and recognizing major ideas and the relative importance of information, and organizing and categorizing main ideas in the passage, respectively. As argued in Chapter 5, above, these skills may be associated with generating strategies, the most complex of the strategy types scored in the assessment of the level of difficulty of reading tasks in terms of the type of match variable (Jamieson et al., 2000). The classification of Reading to Learn items as generating tasks, and thus as more complex than any other reading tasks on the TOEFL® test, is in accordance with the statement of the design principles of the Reading Comprehension Section of the newest edition of the TOEFL® test (originally known as TOEFL 2000 and Next Generation TOEFL) in Enright et al. (2000). In their description of the difficulty continuum of reading tasks on the new TOEFL® test, the same authors claim that

> *"easy tasks could be designed for reading to learn … and difficult tasks asking examinees to find discrete information or read for general comprehension could be designed by manipulating task and linguistic/syntactic variables. Still, we are more likely to find reading to learn … associated with more challenging academic tasks and to require more sophisticated processing abilities than reading to find discrete information or reading for general comprehension."* (op.cit: 6)

However, the results of a study conducted by Cohen and Upton (2006) focusing on strategies used in responding to these new TOEFL® reading tasks are not consistent with the expectations, that Reading to Learn items would be more challenging than other reading tasks. Their study, involving think-aloud reports produced by 32 nonnative speakers of English when taking two New Generation TOEFL® practice tests (ETS, 2003[1]), suggests that, whereas the test designers' aim may have been to construct academically more demanding items, subjects' reports seem to indicate that they found Reading to Learn items relatively easy. Cohen and Upton (op.cit) offer two explanations for this result, the first of which stems from the fact that these items are always the last within each test. According to these authors, *"they [examinees] had become quite familiar with the passage and the key ideas because of their efforts to answer all the other items that always come before them."* (op.cit.: 114) The second explanation offered by Cohen and Upton (op.cit) is that, although intended to reflect how respondents might

[1] These two tests, originally part of the 2003 ETS *LanguEdge Courseware*, have been reprinted within *The Official Guide to the New TOEFL® iBT* (ETS, 2006a) and are part of the corpus in this study.

perform in a summarization task in an authentic setting, Reading to Learn items do not approximate real-life summarization tasks. The same authors claim that since

> *"no writing is called for in the Reading section, and even the set of possible main points is provided for the respondents so that they only need to select those that they are to drag into a box (whether astutely or by guessing), they do not need to find main statements in the text nor generate them (e.g., by reconceptualizing lower-level ideas at a higher level of abstraction)."* (Cohen and Upton, 2006: 113-114)

Cohen and Upton (2006: 118) conclude that, while the tasks and expectations for the three broad items in the TOEFL® iBT—Basic Comprehension, Inferencing, and Reading to Learn, the first two of which also present in both the TOEFL® PBT and CBT—are clearly different, *"they all tend to draw the same sorts of strategies from respondents."*

It may be inferred from these considerations on the testing purposes and ranges of difficulty of the test items in the Reading Comprehension Section of the TOEFL® test that, despite the apparent differences in terms of the frequency and complexity of the skills tested in the different editions of the test, there seems to be a consistency on the focus given to certain skills which may be said to represent the 'core' of the construct of reading reflected on the test. The following subsection is concerned with the skills which are felt to be at the core of reading ability as represented on the TOEFL® test.

6.2.2 Paraphrasing and Reading Ability on the TOEFL® Test

The analysis of the TOEFL® reading comprehension tests in this corpus suggests that the observance of different forms of repetition in text, which will be here referred to as *paraphrasing skills*, is involved, to a larger or lesser extent, in all question types in all editions of the test. Two basic categories of paraphrase may be identified based on the types of lexical links involved in the bonds formed between correct options and passage.

The first and more frequent of these categories will be here termed *repetition-based paraphrase*. Repetition-based paraphrases are represented in this corpus by test items marked by types of links which are more readily observed and only marginally text-bound, i.e., the connection between the lexical links involved is often not limited to the context in which they figure in the test. Instances of repetition of this kind include: Simple and Complex Repetition, Simple Synonymy, Simple Antonymy, as well as Superordinate and Hyponymic Repetition. Test items focusing on repetition-based paraphrasing skills in this corpus include Vocabulary (for individual items), Factual Information, Locate Information, Sentence Simplification, Negative Factual Information, and Main Idea questions.

It should be clear from Figures 1 to 5, above, that Vocabulary and Factual Information are the two question types which stand out in frequency in the three editions of the TOEFL® Test. When combined, these two types represent about 50% of the total number of items in this corpus. As argued in Section 5.2, above, the dominant link associated with Vocabulary items is Synonymy, whereas Repetition is the dominant link associated with Factual

Information questions in the corpus. These may thus be said to be the most representative of the test items on the TOEFL® test focusing on repetition-based paraphrasing skills.

The second and more complex paraphrasing category focused on in the Reading Comprehension Section of the TOEFL® test will be here termed *inference-based paraphrase*. Inference-based paraphrases are represented in this corpus by test items marked by types of links which are inherently text-bound and which require the identification of either low-level or high-level inference. Instances of repetition of this kind include: Complex Synonymy, Complex Antonymy, Co-Reference, Labeling, Substitution, and Ellipsis. Inferencing items are the most representative of the items focusing on inference-based paraphrasing skills on the TOEFL® test. These items, present in all versions of the test, represent about 9% of the total number of items in the corpus. Other question types in this corpus which may be said to often focus on inference-based paraphrasing skills include Rhetorical Purpose, Insert Text, Reference (for individual items), Prose Summary, and Fill in a Table questions.

The importance given to paraphrasing on the TOEFL® test has been made even more evident in the course materials designed by the ETS to prepare prospective test-takers to the newest version of the test, the TOEFL® iBT. Thus, for instance, the suggested reading activities in the *Helping Your Students Communicate with Confidence* manual often have *"recogniz[ing] and creat[ing] accurate paraphrases of information from a text*" as one of their main learning objectives (ETS, 2005a: 111, 112, 114, 129, 130,132, 133, 134).

These considerations on the focus given to paraphrasing skills in the construct of reading reflected on the TOEFL® test suggest that the observance of lexical cohesive patterns in text should play a central role in the demonstration of effective reading skills in English, as far as this assessment instrument is concerned. The following section will discuss the implications and limitations of this conclusion.

6.3 Final Considerations

It has been suggested in Section 6.2, above, that the observance of lexical patterns is a fundamental skill in the construct of reading reflected on the TOEFL® test. It would be of interest, therefore, to consider, firstly, the extent to which the explicit teaching of this skill might benefit students preparing for the TOEFL® test, and, secondly, whether this conclusion would be replicable in real-life reading practices within the criterion environment, namely academic settings where the language of instruction is English.

The first of these inquiries regards the pedagogical implications of the conclusions reached in this thesis. Decades of research on reading, and on reading comprehension in a foreign language, indicate that effective reading is largely dependent on the purpose of reading (Nuttall, 1996: 44-61; Carrell et al., 1988: 74-5; Grellet, 1981: 6). In other words, *"provided that a reader can satisfy his purpose in reading or using a given text, we can conventionally say that that person has understood the text."* (Alderson, 1996: 226) In their study focusing on the strategies used by examinees to cope with the reading tasks

in the TOEFL® iBT (discussed in Section 6.2, above), Cohen and Upton (2006: 117) concluded that

> *"subjects approached the new TOEFL® reading section as a test-taking task that required that they perform reading tasks in order to complete it. In other words, the primary goal of the subjects was to get the answers right, not necessarily to learn, use or gain anything from the texts read."*

The most frequent test-management strategies used by the subjects in the same study include "*read[ing] the question and then read[ing] the passage/portion to look for clues to the answer, either before or while considering options,*" "*select[ing] options through vocabulary, sentence, paragraph, or passage overall meaning (depending on item type),"* and *"[d]iscarding option(s) based on vocabulary, sentence, paragraph, or passage overall meaning as well as discourse structure."* (Cohen and Upton, 2006: 36, 43) This means that these students attempted to selectively process portions of the passage in search of potentially relevant sentences in relation to the question. It should also be noted that the strategies used by these subjects are intended to reflect the practices of successful EFL readers since Cohen and Upton (op.cit.: 106) describe their level of language proficiency as high.

Hoey (1991: 226) has highlighted the fact that *"repetition in text is a measure of mutual relevance.*" There is no clear indication, in Cohen and Upton's (2006) study, that the respondents' approach to selecting relevant portions of the passage included the identification of bonds these text

excerpts form with question stems and correct options through lexical repetition. On the other hand, it should be apparent from evidence provided in this thesis, in line with previous related studies (Batista, 2002; MacMillan, 2006), that the observance of lexical patterns may be said to provide appropriate clues in this regard. Therefore, a pedagogic experiment that might prove to be beneficial to EFL students preparing for the TOEFL® test would be to devise a simplified version of the lexical cohesive analytical system used in this thesis for use in the classroom. This simplified tool could be used to systematize the explicit teaching of repetition-based and inference-based paraphrasing skills (as discussed in Section 6.2.2, above). A comparison of students' performance when writing TOEFL® reading comprehension practice tests before and after a period of practice of this system would provide insights as to the extent to which success levels might have improved.

A second possible inquiry, arising from the conclusions reached in this research, concerns their replicability in actual academic reading. Because the TOEFL® is a high-stakes test, used as a gatekeeping mechanism for international education, and administered to an extremely wide number of candidates all over the world, the ETS, the organization responsible for the design and administration of the TOEFL® test, takes great pains to ensure that this assessment tool is as reliable as possible. The ETS supports a continuing program of research related to the TOEFL®, which is carried out under the direction of the TOEFL® Research Committee. In terms of the TOEFL® Reading Comprehension Section, research efforts are reflected in a number of revisions made to that section, since the introduction of the TOEFL® test in 1963; these include, among other changes, the intention of

making the test *"more reflective of communicative aspects of language behavior."* (Schedl, Thomas & Way, 1995: 1, citing Swain, 1983)[2] Among the latest efforts of the TOEFL® research program, the TOEFL® 2000 project may be cited, which involved a series of studies (e.g., Hudson, 1996; Biber et al., 2004) culminating in the design and implementation of the TOEFL® iBT. Here, it is claimed that the reading section is intended to *"more fully reflect the construct of academic reading"* (Hudson, 1996: 1).

Over the years efforts have been made aimed at ensuring that the TOEFL® Reading Comprehension Section replicate, as far as possible, the conditions under which engagement with communicative content is made within the criterion setting. Nevertheless, there are obvious limitations involved. Thus, the constraints imposed by the need for a procedure that is fair to all candidates, and elicits a scorable performance, entail accepting, to a greater or lesser degree, the artificiality of the test situation (McNamara, 1990: 27-30). In the case of the TOEFL® test, this involves the use of the conventional and, admittedly, inauthentic fixed-response test format. For this reason, the conclusions in this thesis regarding the role played by lexical cohesion in reading comprehension should, a priori, be subject to the limitations of the construct of reading reflected on the TOEFL® test.

In terms of future research, which may expand upon and improve the present project, one clear avenue would be to investigate whether lexical patterns may also be observed in the reading comprehension portion of other standardized proficiency tests of English involving different response formats

[2] One of these revisions involved the incorporation of vocabulary items within the Reading Comprehension Section of the test. These items had been previously grouped together in a separate Vocabulary Section in which they were tested within isolated sentences. The change was intended to provide these items with an extended passage context, in line with studies reflecting a communicative approach to the teaching and testing of reading, including Drum and Konopak (1987), Sternberg (1987), and Barnett (1988).

(e.g.: the IELTS, International English Language Testing System; the CPE, Certificate of Proficiency in English). In conclusion, it is hoped that the present study may inspire further patterns of investigation on the testing of EFL reading.

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Appendix I

Winter (1977: 14, 16, 20)

Vocabulary 1: The Subordinators of English
after, (al)though, (as though), apart from –ing, as, as far as, as well as –ing, at the same time as, on the basis that, because, before, besides –ing, by the time that, by –ing, except that, far from –ing, for, from the moment that, given that, granted that, on the grounds that, how, however, if, (as if), (even if), in addition to –ing, in order to/that, in spite of –ing, in case, instead of –ing, inasmuch as, no matter how, now that, once, on condition that, provided that, rather than –ing, seeing that, short of –ing, since, so that, so … that, such that, so much so that, supposing that, than, that, unless, until, what, whatever, when, whenever, where, wherever, whereas, which, while, who, why, with the result that, etc. Correlative pairs: *(just) as* X *so (too)* Y, *not so much* X *as* Y, *not* X *let alone* Y, *the –er … the –er*
Vocabulary 2: The sentence Connectors of English
Accordingly, in addition, all the same, also, alternatively, anyway, as such, as a result, at any rate, at least, at the same time, basically, besides, in that case, in any case, in such circumstances, in comparison, consequently, in contrast, on the contrary, conversely, correspondingly, differently, equally, essentially, in the event, for example, for instance, for this reason, for this purpose, furthermore, generally, in general, hence, here, hitherto, however, indeed, in effect, in fact, in reply, in return, in short, in turn, in this way, in other words, in spite of this, instead, likewise, meanwhile, moreover, nevertheless, otherwise, on the other hand, in particular, rather, similarly, so, more specifically, still, then, therefore, thereafter, thereby, there, therein, though, thus, that is, that is to say, to be more precise, up to now, what is more, yet, etc. Correlative pairs: *not only (but) (also), for one thing … for another, in the first place … in the second, on the one hand … on the other.* *Firstly, secondly, finally,* etc.
Vocabulary 3: Proposed Lexical Items of Connection
achieve, addition, action, affirm, alike, analogous, antithesis, attitude, attribute, basis, case, cause, characteristic, change, common, compare, compatible, concede, conclude, condition, confirm, connect, consequence, constant, contradict, contrast, converse, correct, correspond, deduction, deny, depend, differ, differentiate, distinction, distinguish, do, effect, equal, error, evaluation, event,exemplify, exception, expect, explanation, fact, feature, follow, form, function, general, grounds, happen, hypothetical, identify, instance, instrumental, justification, kind, lead to, like(ness), manner, match, matter, mean, means of, method, move, name, observation, object, opposite, parallel, particular, point, problem, real, reason, reciprocate, repeat, replace, reply, requirement, resemble, respect, result, reverse, same, similar, situation, sort, solution, specify, state, subsequent, surprising, synonymous, technique, thing, time, truth, unique, way, etc.

Appendix II

Hoey (1991)	Halliday and Hasan (1976)
Substitution	
• Personal pronouns e.g.: *he, it, them*	Reference
• Demonstrative pronouns (*this, that, these, those*)	Reference
• *one*, when used as a nominal head accompanied by modifiers e.g.*: the first one, another one*	Substitution
• *do*, when followed by *it, the same, this, likewise,* or *so*	Substitution
• *so*, when used as a clausal substitute e.g.: "*They said so"*	Substitution
• *not*, when used as a clausal substitute e.g*.: "They said not"*	Substitution
• *the same,* when not modifying an item (repeated or otherwise) e.g.: *"The same applies to …"*	Substitution
• Ellipsis e.g.: "One Æ derives from the fact …"	Ellipsis

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